

3D WORLD

THE MAGAZINE FOR 3D ARTISTS, IT IS

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star wars

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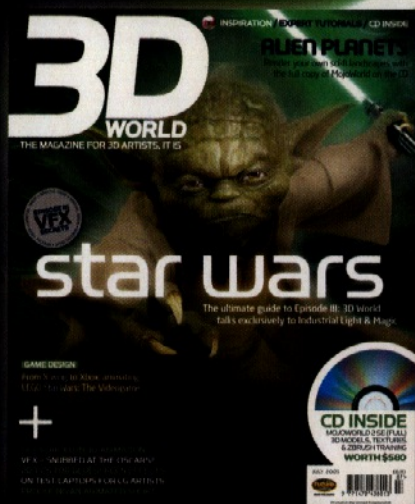
THE ORIGINAL YODA PERFORMANCE came courtesy of a puppet painstakingly sculpted around a cast of the arm of Frank Oz, and turned into latex. Years later, during pre-production on *Star Wars: Episode II*, members of ILM's effects team finally convinced George Lucas that he was a real digital proposition. Then, using a combination of ILM's *ISculpt*, scanned data from a maquette and *Power Animator*, *Maya* and *Softimage|3D*, the all-digital, lightsaber-wielding Jedi Master was born.

Fast-forward to today, and ILM Animation Director Rob Coleman explains Yoda's further evolution. "We can see translucency in his ears," says Coleman. "The surface light is handled with ambient occlusion and depth maps; all that control of illumination has made a dramatic difference. We have breathing, swallowing neck shapes, and his eyes are remarkable. We're thinking about physicality, and about how the way he's feeling affects the way he moves."

Throughout his life, Yoda has been one of the benchmarks of character creation; he first appeared when cinema audiences were witnessing the birthplace of movie animatronics, and his looks have improved with age. Almost 30 years later, as the articulated and soulful fully CG Yoda kicks ass at the multiplex for a final time, we pay tribute to his Excellency in our *Star Wars* feature on page 30, and ask the burning question: a cooler alien ever will there be?

[w] www.ilm.com





star wars

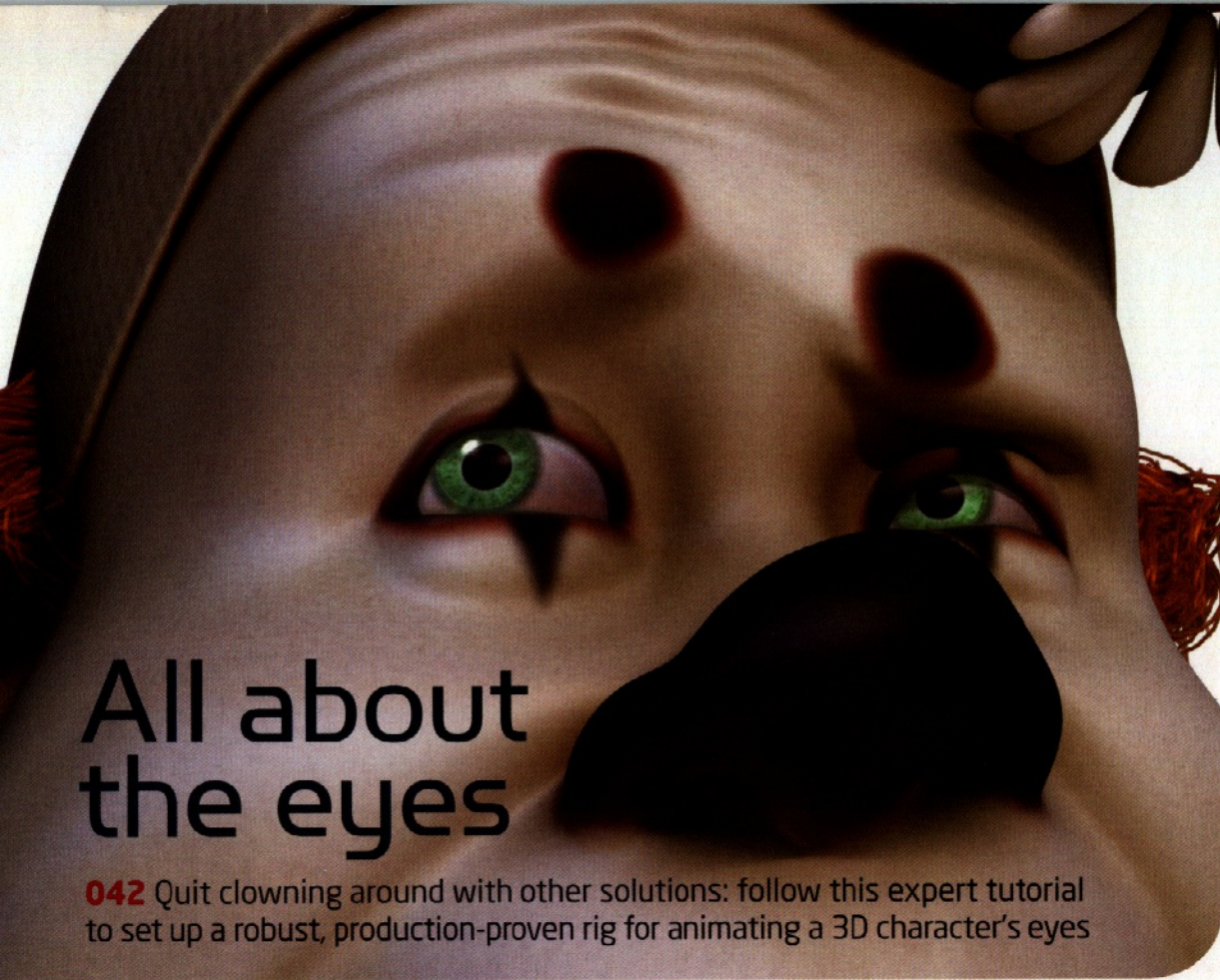
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All about the eyes

042 Quit clowning around with other solutions: follow this expert tutorial to set up a robust, production-proven rig for animating a 3D character's eyes

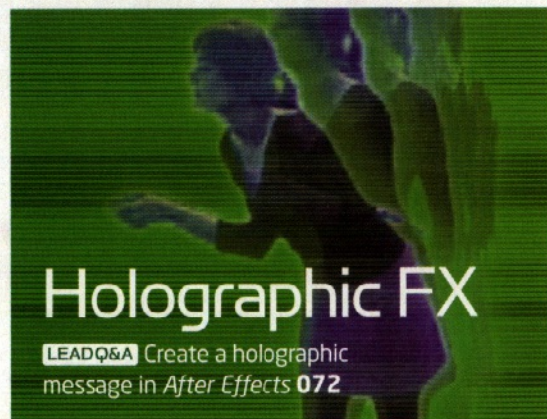
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ZBrush training
and 3D models
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3D World is brought to you with the help and advice of leading 3D industry figures

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**European Representative,
DreamWorks Animation**

Shelley Page started her career in feature animation as Backgrounds Supervisor on Disney's *Who Framed Roger Rabbit?* She was one of the first artists hired to form DreamWorks Animation in 1995. She is now DreamWorks' European Representative resourcing new talent for the studio.
www.dreamworks.com

JORDI BARES



Senior 3D Animator, The Mill

Jordi Bares worked for eight years in the games and film industries in his native Spain, before moving to London in 2000, where he has also freelanced at Jim Henson's Creature Shop and Passion Pictures. The winner of many awards, he was nominated for an Emmy for his work on the BBC documentary *Pyramid*.
www.the-mill.com

ANDREW DAFFY



CGI Supervisor, House of Curves

Andrew Daffy has worked in the CGI industry for ten years on projects that have accumulated over 30 awards. He was recently named one of Alias's *Maya Masters* for 2004. His new company, The House of Curves, will act as both a studio and a training school.
www.thehouseofcurves.com

ALEX MORRIS



Director, Hayes Davidson

Alex Morris qualified as an architect in 1990 and joined architectural visualisation agency Hayes Davidson in 1996, having completed over 40 buildings across a number of sectors. He is responsible for many of HD's landmark images, including the UK's Millennium Dome, and the Tate Modern art gallery.
www.hayesdavidson.com

JOLYON WEBB



**Principal Artist, Codemasters
Software Company**

Jolyon Webb moved into developing game art after years as a freelance illustrator. He works at leading videogame studio Codemasters as Principal Artist in the Central Technology Group: the company's internal research and development team.
www.codemasters.co.uk

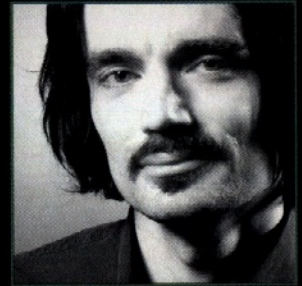
AARDMAN ANIMATIONS



**Scott Pleydell-Pearce, Bobby
Proctor and Stefan Marjoram**

Respectively CGI Animation Head of Department, CGI Lighting/Technical Head of Department and a Creative Director for the commercials department, Scott, Bobby and Stefan have over 20 years' combined experience at Aardman, working on a range of award-winning ads, idents and short films.
www.aardman.com

Editor's perspective



Are 3D artists cool? Or, to put it another way, is 3D a lifestyle choice that many people in the outside world would want to make? The question was forced into my mind this month with the launch of a new range of products targeted at "animators, modelers and computer artists focused on fun". Or, as the company's slogan would have it: 'creative clothing for creative people'.

Created by the same company as the Digital-Tutors training DVDs, visitors to the Your Next Tee website, www.yournexttee.com, are treated to a range of perky, sub-catalogue models (so many styling products, so little time...) dressed in T-shirts with 3D-related slogans ranging from 'FK it' and 'Fondle My Dongle' to the truly mind popping 'Mocap Fo Shizzo'.

The initial reactions of the CG community might best be summed up as 'guilty recognition'. "I wouldn't say that they're nerdy – or, in fact, they're so über-nerdy, no-one would think that they're nerdy," ran one fairly typical forum posting. Or, to put it another way: "So lame, they're great".

So there you have it. The masons have special handshakes to identify themselves to one another; 3D artists have T-shirts with slogans they have to explain to outsiders in the pub.

But what does that outside world really think of us? We may get to preserve our strange haircuts, work unsociable hours, and generally defer the whole tedious business of becoming a proper adult for a few more years, but it's hard to see a career in CG having quite the same kudos as, say, being in a band. (At least, not unless The Libertines' idea of a good night at work secretly turns out to be sitting in a darkened room waiting for a render to finish.) The punters may look at the end results and marvel, but then, most of them still think that the computer does all the work. All in all, Your Next Tee probably sums up the public's opinion of 3D artists pretty accurately: caught midway between geek and chic.

So can CGI ever become the new rock and roll? And does it really matter? Answers to the usual address, please, marking your emails 'Suck on These NURBS'.

But now, another musical connection. This month, Owen Bailey, the hidden driving force behind *3D World*, and the writer of most of its best jokes (many of them sadly destined for the cutting room floor at the behest of a nervous editor) is leaving the magazine. Owen goes off to become Deputy Editor on our sister title, *Guitarist*, in order to explain the hidden mysteries of frets and amps, and to make Slash, Satriani and Santana seem relevant to the modern generation. And that, surely, is a market more in need of good sloganeering skills than 3D will ever be. Although 'swap your renders for Fenders' does have a certain ring to it...

JIM THACKER Editor
jim.thacker@futurenet.co.uk

LETTER OF THE MONTH

Congratulations to softdistortion, who wins a copy of *Machineflesh*, published by Ballistic Publishing. The first book in the CG Challenge series, it features the images and techniques of artists participating in the online contests organised by CGNetworks.com and CGTalk.com. The book has tutorials and artwork from the contestants of the Machineflesh Challenge. www.ballisticpublishing.com, www.cgnetworks.com



LETTER OF THE MONTH

After reading Colin Kai Heaps' Letter of the Month in issue 63, I wanted to add a few points. Firstly, Colin didn't mention www.shirowproject.com, the collaborative CG team he has been part of for the last year. The saucy lad is now in a position to speak boldly, but our team knew him back when he was in the same position as Chris and many other 3D wannabes – new, and sometimes frustrated due to lack of ability. [Colin wrote to us in response to Chris Leighton's letter in issue 60, complaining how hard it was to get started in 3D – Ed.]

In Colin's case, he has long since got over any such frustrations and today, he's one of our main team members. Not only have his modelling skills improved vastly, but he is also now our resident *MotionBuilder* guru! So what helped him go from newbie to guru in such a short space of time? As he says, work and practice are essential, but what about the team he had encouraging him to keep at it?

I think that some people trying to break into 3D become discouraged because they basically end up doing all that work and practice alone. If, like Colin, they were to seek out and join a collaborative team, it could be so much better for them. Just as being in a band gives you the opportunity to get together, jam

with your friends and maybe have a pint or two, a collab team is more fun because you're not all alone.

For example, shirowproject has a forum where we post our work in progress and get steady feedback from team-mates. We regularly discuss team issues online in real time, and

have even made friends through the project. If we feel frustrated, we have the others spurring us on. I'm pretty sure none of us would be as far along as we are without the benefits of this way of working. To take the band analogy a step further, if Mick Jagger had only practised singing alone at home, where would the Stones be today?

**softdistortion | Team Leader,
shirowproject**



● A rendered still produced by shirowproject, an online 3D collaboration team

A copy of the *Machineflesh* book is now winging its way to you in the post. Hopefully, it'll prove of use to you – and also to Colin and the other shirowproject team

members. We've had a number of enquiries in the past about collaborative online 3D projects, including how to set them up, what you can hope to achieve, and the circumstances in which they succeed or fail, and this is certainly a subject we hope to return to.

MAC ADDICTION

➤ In response to your article on whether there is a future for 3D on the Mac, having used Macs to do 3D for the past seven years, things certainly look fine to me.

Our company is entirely Mac-based, except for one shuttle PC that we bought as an experiment, looking to develop a cheap render farm for *Cinema 4D NET*. Although the PC is a very fast renderer (its single Athlon 2.8GHz processor almost keeping up with a dual 1.42GHz G4), we found that its 1GB of RAM would return 'out of memory' errors on projects that our older Macs would chug through with only 512MB. This problem may have been overcome with Windows XP, but once bitten...

Buying PCs in bits and putting them together may look like a cheap option. But as these

parts no longer come bundled with Windows, by the time you add all of the costs up, there's virtually no difference to buying an equivalent Mac. So we've ended up opting for expensive G5 servers which chew through anything we throw at them, with characteristic Mac reliability.

And, at the end of the day, it's better the devil you know. When I first started using Macs, it infuriated me that there was no equivalent of DOS to sort things out. Now that I can handle a Mac, I don't have a clue what to do when PCs go wrong. Having the option of software like *Softimage|XSI* would be nice – but then again, the difference between

top-end apps is similar to the difference between the machines themselves: a matter of personal preference.

Will Adams | Once Were Farmers

Reliability is certainly an important issue when choosing a hardware platform, particularly for a small company. But as some of the other feedback we received this month indicates, not everyone agrees about the benefits of Macs – or of the importance of having access to software like *XSI*.

MAC DERISION

➤ There were two articles in issue 63 that I would like to comment on. The first article is the one about the future of 3D on the Mac; the other is Craig Zerouni's opinion column, 'Shake, rattle and roll'. In my opinion, the first article contains a major omission – a point of view that the second partly supports.

Apple has not achieved the dominance in the 3D market that it has in 2D design, and probably never will. The Mac has always been the best personal computer available, but the

cause of its strength has also been a limitation. The rigid controls the company enforced over its hardware backfired because inferior [Windows boxes] offered something that Apple didn't – choice. In particular, the wide range of compatible hardware had a greater appeal to hobbyists than the quality of the Mac.

These hobbyists that chose the PC then went on to have a profound influence on one of 3D's biggest market sectors: videogames. This is a huge industry in which Mac has very little influence. To this day, two of the major software packages used in game development, *3ds max* and *Softimage|XSI*, only run on PCs.

And when Apple did acquire a 3D-related package, it was *Shake*. This seems a further part of the company's policy of focusing on high-end, flashy industries like film. *Shake* may be the best desktop compositor around – but then, this isn't the first issue in which Craig Zerouni has called for open-source compositing software.

Your article focused primarily on the film industry. But the PC doesn't cater to specific industries, and that's why it has



● Fast and reliable, or expensive and over-specialised? The jury is clearly still out over the use of Macs in the 3D industry



● Our group test of cameras from issue 64: differences in usage and battery types unfortunately prevented us from including meaningful figures for battery lifespan

a broader appeal than the Mac. XSI offers its users built-in compositing, while *combustion* offers excellent *3ds max* integration.

Using my Intel machine, I can make mods for *Half-Life* and do compositing work – and all without having to switch software package.

Simon Hayes | Via email

The mass appeal of PCs has certainly been an incentive to develop for Windows. But surely game development is no less a high-end field than the industries in which Macs have traditionally been dominant? Thanks for all your feedback on the relative merits of Macs and PCs. While this subject is now closed for correspondence, you can by all means post further comments on our forum.

BATTERIES NOT INCLUDED

> I really enjoyed your review of the five digital cameras in issue 64. But nowhere in the reviews of any of the cameras did you mention what kind of batteries they used, and how long those batteries lasted. Was this information taken down? If so, I would love to know the results, as I'm thinking of upgrading my camera and would consider it to be

important information. It's most annoying to get halfway through a shoot and have the batteries run out.

Jutta Stiller | Via email

We forwarded Jutta's email to Mat Broomfield, our reviewer, who replied: "I didn't include battery lifespan in the reviews since there are so many factors that affect the overall figure. By far the most important of these is the frequency with which you use the flash, and the amount of power it draws. The other major problem in arriving at a definitive figure is the fact that some of the cameras include rechargeable Lithium-Ion batteries, while others use off-the-shelf AAA cells. The rechargeable ones tend to last longer, but cost much more to buy. Thus, it's unlikely that you would take three or four spare sets on a shoot. Furthermore, if they run out, you can't just pop to a local chemist for refills. For preference, I would never buy a camera that uses proprietary rechargeables."

IT'S ALL A BLUR

> I have noticed that the line between different software

packages – in my case, mainly *Photoshop* and *3ds max* – is becoming a bit of a blur. Does anyone else find themselves trying to rotate a photo using the 3D controls? I do.

And then there is 'vertex eye'. This happens when you are modelling in vertex mode only to find that your face is nearly pressed against the monitor, as if being drawn in by the vertex. After several hours of this, you develop a strange eye twitch. Is this normal?

DangerMouse | Via the forum

Probably not, but then, isn't it high time 3D had its own 'status ailment'? At the minute, the best we can claim is Repetitive Strain Injury, which any office worker can manage in a matter of months. If you've managed to contract Inflamed NURBS or Render Wrangler's Lung over the course of your career, our Inbox is standing by...



● Vertex Eye – could this be a candidate for the 3D users' very own, brand-new status ailment?

Your feedback | MAILBOX

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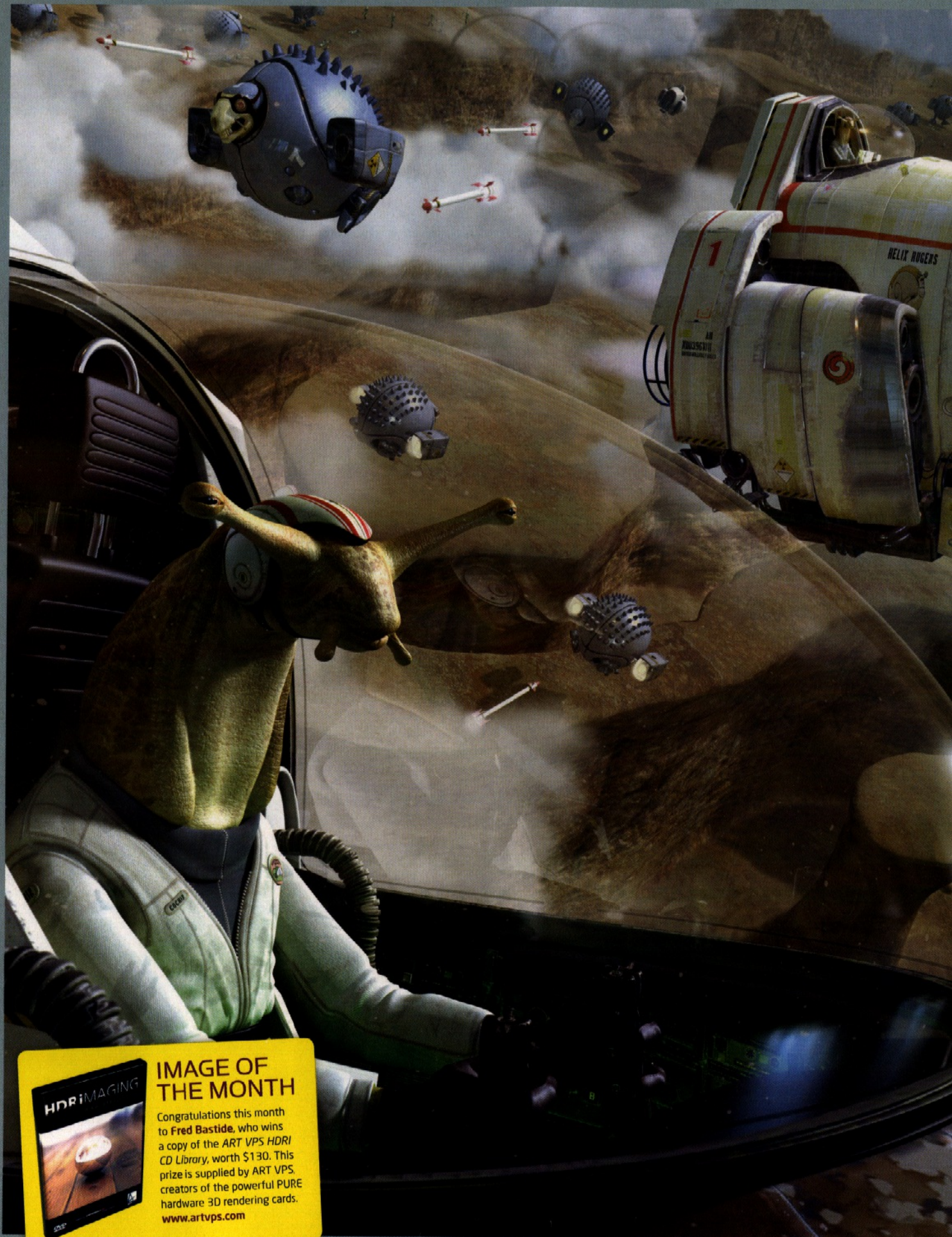
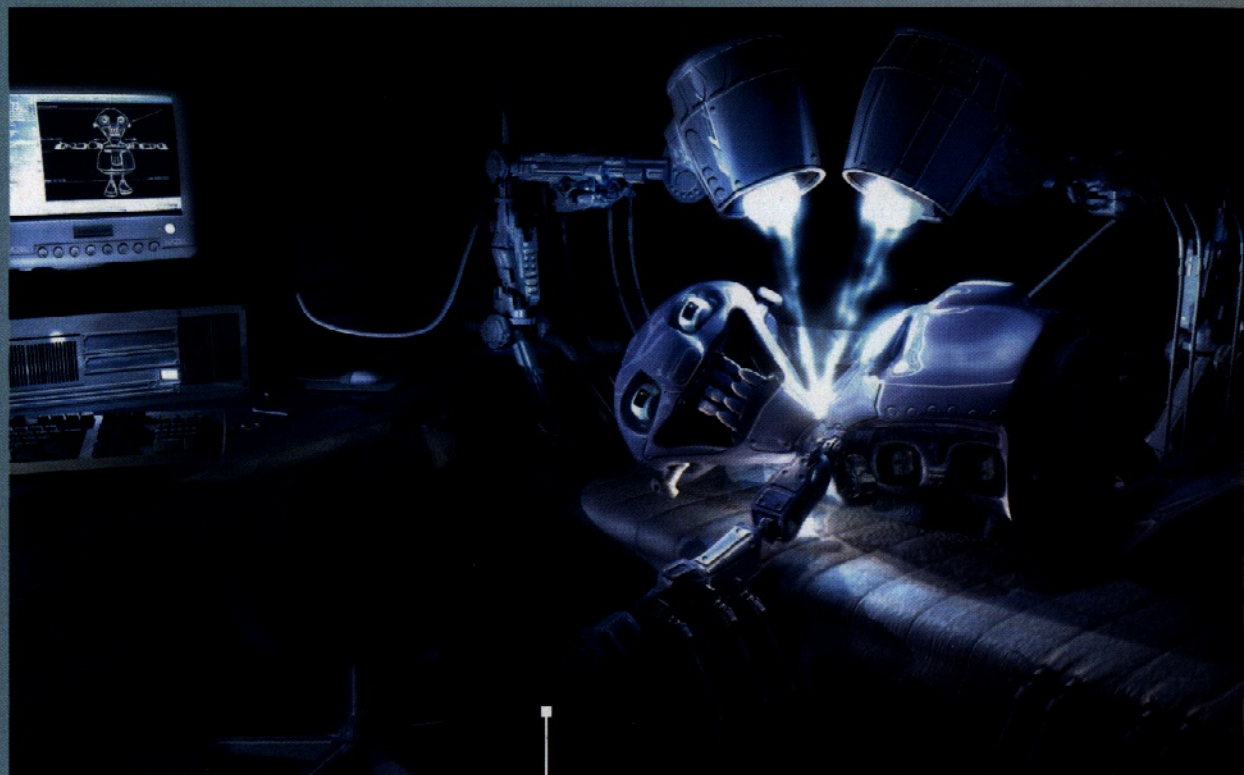


IMAGE OF THE MONTH

Congratulations this month to **Fred Bastide**, who wins a copy of the **ART VPS HDRI CD Library**, worth \$130. This prize is supplied by ART VPS, creators of the powerful PURE hardware 3D rendering cards. www.artvps.com



STEVE CLARKE Assembled
Lightwave 7.5, Photoshop

"I don't really consider myself a 3D artist - I see myself more as a 'virtual photographer'. I'm not much of a modeller; I simply set up scenes, adjust the lighting, position the characters and then snap the shot."

[e] escelce@aol.com

[w] www.portfolios.com/escelce

JUSTIN DOWLING Sun In An Empty Room
3ds max 5.1, Brazil 1.0, Photoshop

"I'm an advanced media developer working in the defence sector in Bristol, UK. This image was a simple exercise in the use of different lighting styles (it has one skylight, one area shadow spot and one raytrace shadow spot). I think its effectiveness comes from its simplicity and, of course, Edward Hopper's excellent composition."

[e] potentialbuddha@hotmail.com

FRED BASTIDE Helix Rugens 1
3ds max, V-Ray, Photoshop

"I'm 34 years old and I live and work in the French part of Switzerland. I currently work in a sector that's completely unrelated to CGI. However, I create some illustrations and computer-generated images as a freelance artist in my spare time. I made this image for the CG Talk community challenge, which was to create a space opera. The picture shows the fight between space slugs and albino atomic hedgehogs. I named the image Helix Rugens 1 to give it a martial feeling. Though I thought the subject was rather idiotic, I decided to treat it very seriously, and in a realistic and academic way."

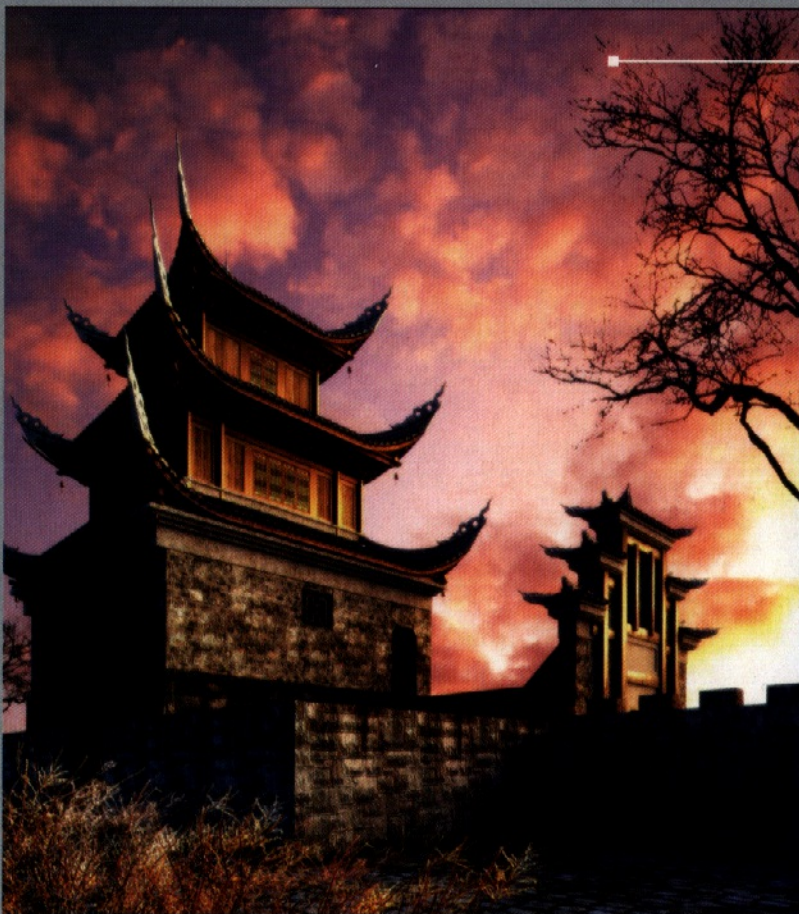
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EXHIBITION



XIAOGE LIU Time The Door, Warfare Is Later,
Mystical Morning, Evening: The City Gate
3ds max, Photoshop

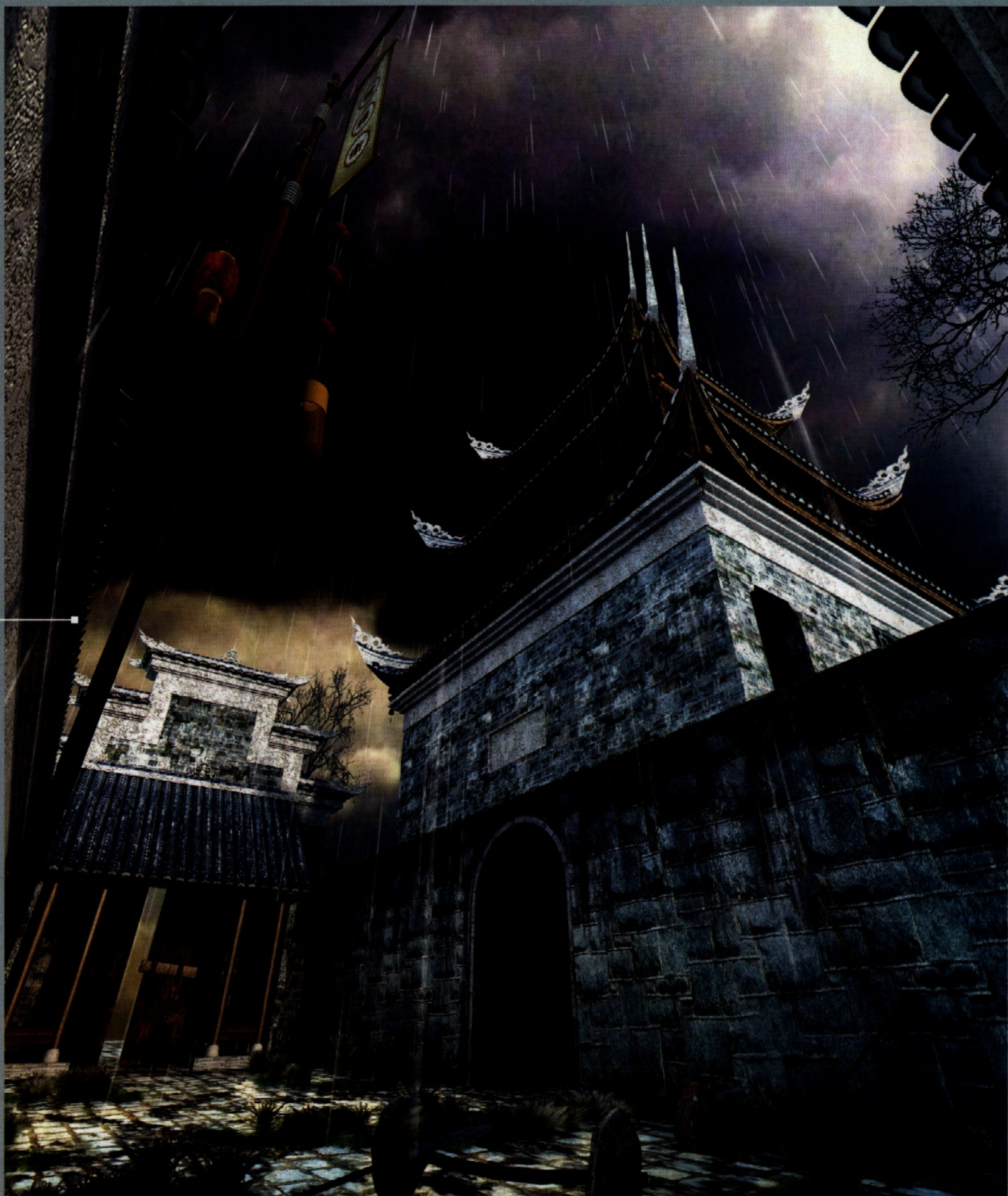
"I started my career as an interior decorator and designer nine years ago, and then moved into the architectural visualisation field. I wasn't formally trained, and I learnt a lot by creating images with passion. I had a degree in Chinese literature, and many skills in writing apply to image designing too. My aim was to create these images with typical Chinese characteristics. I enjoy visiting old villages and towns, collecting material for my work."

[e] xiaogellu@126.com

[w] www.exquisitus3d.com



Send us your exhibition images | For postal address, see page 9

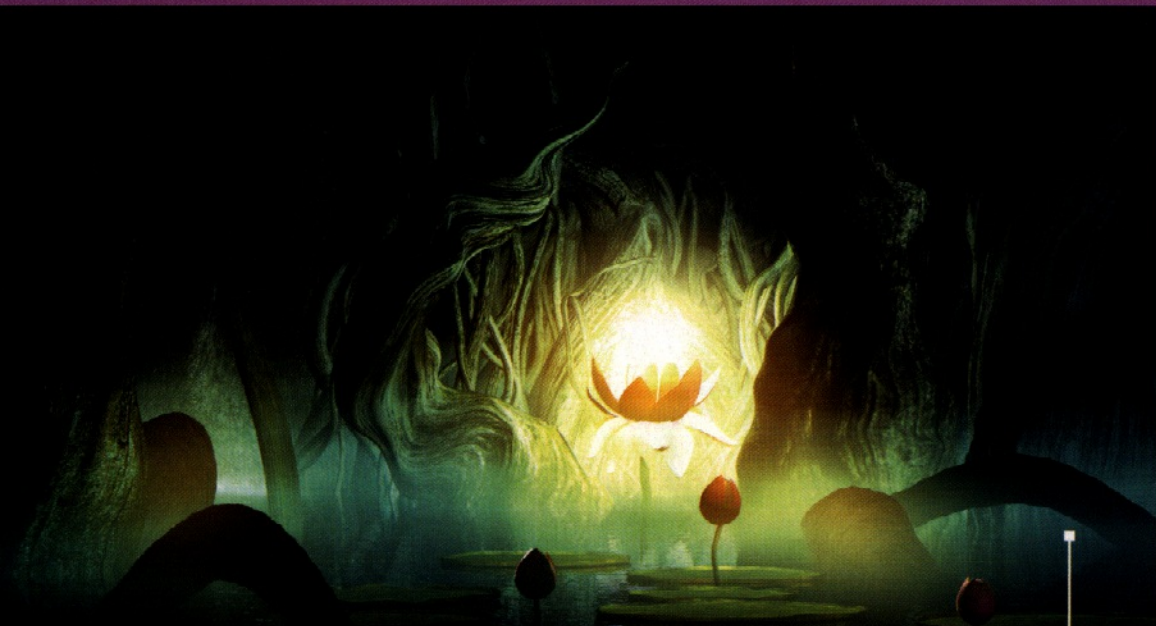




RENDEROSITY GALLERY

Register online | www.renderosity.com





AXEL RITTER *Genesis, In Laurin's View*
Cinema 4D

"After working for several years as a scanner operator, three partners and myself founded our own DTP company. My first contact with 3D was in 1998. I'm now working on a Mac, using *Cinema 4D*. My latest addition is *ZBrush*."

[e] ari@onlinehome.de

[w] www.renderosity.com/homepage.ez?Who=ritter

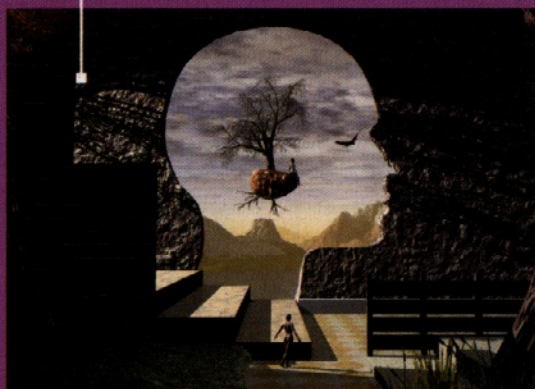


VICTOR BARRETO *You Always Will Be In My Mind*
Cinema 4D, Vue

"I started using *Cinema CE 6* in 2003 as a tool for populating landscapes generated in *Vue 4*. I switched to *Cinema 8.5* in 2004 and am now using version 9.1. I'm trying to master *C4D*, as this would enable me to animate my worlds."

[e] enriquebarreto@hotmail.com

[w] www.renderosity.com/homepage.ez?Who=vbarreto



EMIKOKAMO *Idutsu*
Shade

"I've been creating computer graphics for four years and I'm learning 3D CG by myself. My main tool at the moment is *Shade*. I like modelling humans and rendering a fantasy."

[e] emikopom@wildduck.jp

[w] www.renderosity.com/homepage.ez?Who=EmikoKAMO

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Renderosity offers a vast selection of professional-quality products for all the popular core software programs, including *3ds max*, *Maya*, *LightWave*, *Cinema 4D*, *Vue*, *Bryce*, *Rhino 3D*, *Softimage*, *Carrara*, *Poser* and many others!

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GET LUCKY AT RENDEROSITY!



Check out the many contests that are currently going on at Renderosity. For instance, enter the Graphics Creation Contest and you could win \$500!

PRE-VIZ

NEWS / OPINION / ANALYSIS



Is mobile 3D finally on the move?

MOBILE GAMING Two years ago, experts predicted that by 2005, 3D games on mobile devices would be everywhere. They were premature - yet recent stirrings suggest the sleeping giant is finally waking...

PLUGGED IN

CLARIFICATION

Our story in issue 64 about the release of *3ds max 7.5* used a pic from Blur Studio's *Gopher Broke* short film, next to the caption "Hair of the Gopher: *3ds max* was used in the production of Blur Studio's excellent Oscar-nominated short film, *Gopher Broke*". So there can be no possible confusion over which product was used in the short, distributor Turbo Squid has requested we clarify the following point: *hairfx* from Dimension dESIGN Animation Group was the product used to create the Gopher's fur. www.blur.com



When we compiled our mobile gaming feature in 2003 [The Shrinking Game, issue 43], the world of gaming seemed to be ready to quite literally nestle in the palm of future gamers' hands. While some of the predictions that were made back then haven't transpired, recent events - such as the buzz at the Game Developer Conference 2005 on the subject, Electronic Arts entering the market with 3D titles, and *3D Pool* (published by I-play and developed by Distinctive Developments) becoming the first 3D game in the top ten UK games downloads - once again prompt the question: "Is now the time for 3D artists to get excited about mobile gaming?"

The numbers indicate that, on a global scale, mobile gaming is "skyrocketing" - analyst Screen Digest estimates a global market worth over \$1 billion in 2004, and set to rise considerably over the coming years. "Our 2005 estimate of \$1.7 billion is well accepted by the industry," said Ben Keen, Chief Analyst at the company. "Network operators are becoming very interested in having more 3D games available for download, so many more will certainly follow."

But which device will they be on? Keen notes that while Symbian-based devices such as N-Gage have better 3D performance, the majority of these are still aimed at business users. "The N-Gage has had 3D titles since launch," he added. "However, these have not been a runaway commercial success as the mobile phone games market is dominated by Java devices." New players on the mobile device scene (the games-specific mini consoles PSP, Nintendo DS and the

Gizmondo) offer advanced graphical power and obviate the nagging control issues that dog 3D gaming on traditional phone devices. Yet it's still hard to imagine anyone but Nathan Barley whipping out their portable gaming unit to wish their gran a happy birthday. So why are we still waiting for 3D to take off on phones?

In our original article, Discreet's Keith Russell (now at videogame service provider Babel Media) predicted an upsurge in growth, but admits that this has been slower to materialise than he anticipated: "The business models have not developed as fast as we thought, so developers are still very cautious of increasing development costs," he said. "The challenges of navigating in a 3D environment on a basic handset are still to be fully conquered, but probably the biggest hindrances have been the slow adoption of JSR 184 as a standard,

and the solving of the engine on the handset versus the engine as part of the download."

Like many in the industry, Russell sees marketing as a sticking point for adoption. "The buying demographic is still too console-like: in mobile, it's the number of downloaders that really, really

matter." David MacQueen, Mobile Games Analyst at Screen Digest points out that "network operators don't want to promote individual games: they don't want to 'pollute' their brand with another, so ads for games services have been non-existent or extremely generic. The profile of the mobile games industry is much lower than it should be."

However, some developers are convinced that they're already part of the Gold Rush. "2005 is the year that 3D mobile gaming will take off; we've seen a tremendous surge in interest and development plans from the major mobile publishers, targeting 3D game development," says Thor Gunnarsson of Ideaworks3D, the developer

"3D MOBILE GAMING WILL TAKE OFF IN 2005... THERE'S A TREMENDOUS SURGE OF INTEREST"

THOR GUNNARSSON, IDEAWORKS3D



● **Big business:** the mobile console games market is already worth \$3 billion in software sales per year, with non-console mobiles adding \$1 billion last year, according to Kurt Uhler of the IGDA

TALKING POINT | 3D mobile gaming



"If you look at the GDC sessions, you'll probably note that most of the technologies (RenderWare and X-Forge) are being demonstrated on PDAs. The gulf between typical mobile phone capabilities and those of a PDA is massive, and it will be some time before these technologies run on a mass-market phone."

David MacQueen
Mobile Games Analyst, Screen Digest



"Now is the time for 3D artists to look at which part of the industry they'd like to be working in five years down the road, and make the transition now. 3D technology and art must be adapted to the uniqueness of the mobile environment; those artists that enter the mobile arena have a real opportunity to shape the future of mobile entertainment."

Kurt Uhler
Chairperson, IGDA Mobile-SIG



"3D artists that have good experience with low polygon environments and a talent for wringing high visual quality from pre-lit texture maps should do extremely well in this market for the coming future. If you spent any time in the '90s working in software-rendered environments such as PC gaming, your skillsets are all highly relevant today."

Thor Gunnarsson
Executive Director, Ideaworks3D

of BREW title *Tony Hawk's Pro Skater: 3D Mobile Edition*. The company is showcasing a number of projects at LA's E3 show including its first major original title, *System Rush* (on N-Gage), and a couple of high-profile projects with EA Mobile. He believes EA entering the market with the stated strategy of driving the transition from 2D to 3D mobile gaming will open the floodgates for 3D games developers to switch to mobile phones. "My feeling is that there's actually more demand for 3D development talent than supply."

That talent, according to Gunnarsson, partly consists of "being able to bridge art creation for dual software and hardware rendered worlds: [this] will be priceless for development studios over the next few years in the mobile domain." And for budding 3D artists, he has this advice: "Perfect the lost art of extremely low-poly modelling, or become a master of pre-lit texture mapping. Before we have wide

deployment of hardware accelerated mobile phones, these skillsets will be critical to any 3D mobile development project."

As Chairperson of the IGDA's Mobile Game Development Special Interest Group, Kurt Uhler is ideally placed to assess the industry. He sees it as a growing market, but says that, as the mobile industry matures, the differences in development needs for 3D artists are likely to segment. Mobile console teams will always be bigger, but not necessarily better. "3D development for the non-console mobile and phone market offers more opportunity for individuals with their choice of projects, given the responsibilities they'll have in these teams," he says. "The next step for me will be when I mention that there are already millions of 3D-capable mobile devices on the market, and the developers are not surprised by the statement."

www.mobile3dworld.com; www.igda.org/mobile

FEEDBACK

We want to hear from you on the issues affecting 3D artists, so from now on, once you've read our main news story on the facing page, why not visit our forum and post your reaction to it online?

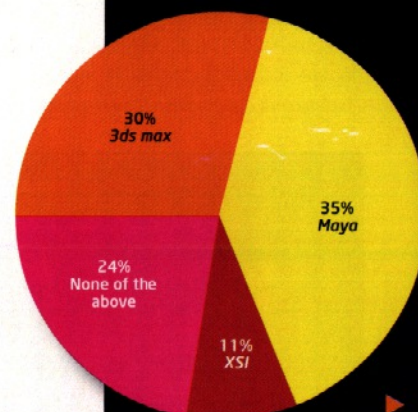
This issue's question concerns the mobile gaming revolution. Despite initial predictions that we would see an explosion in 3D titles by the start of this year, this has so far failed to materialise. So where does this leave an artist hoping to move into the industry? Are 3D games on mobile devices really technologically ready to be considered as a realistic career choice? This month, the question we would like you to answer is:

"Is now the time for 3D artists to get excited about, and start preparing to work in, 3D mobile gaming?"

- **Now is the time** - The floodgates are about to open
- **Not quite yet** - Limitations like basic phone controls, downloads and marketing spoils are still unresolved
- **Not for ages** - Uptake of 3D games titles will remain excruciatingly slow
- **Never** - 3D gaming is too visual; it's best left to PCs and consoles, not phones and tiny handheld screens

LAST ISSUE: THE VERDICT

"Which of the big three 3D applications is likely to dominate next-generation development?"



Have your say | <http://forum.3dworldmag.com>

Animated Encounters 2005

SHOW REPORT A galaxy of 3D stars, from studio heads like Jeffrey Katzenberg to students and indie filmmakers, made their way to Bristol, home of Aardman, for this year's Animated Encounters festival

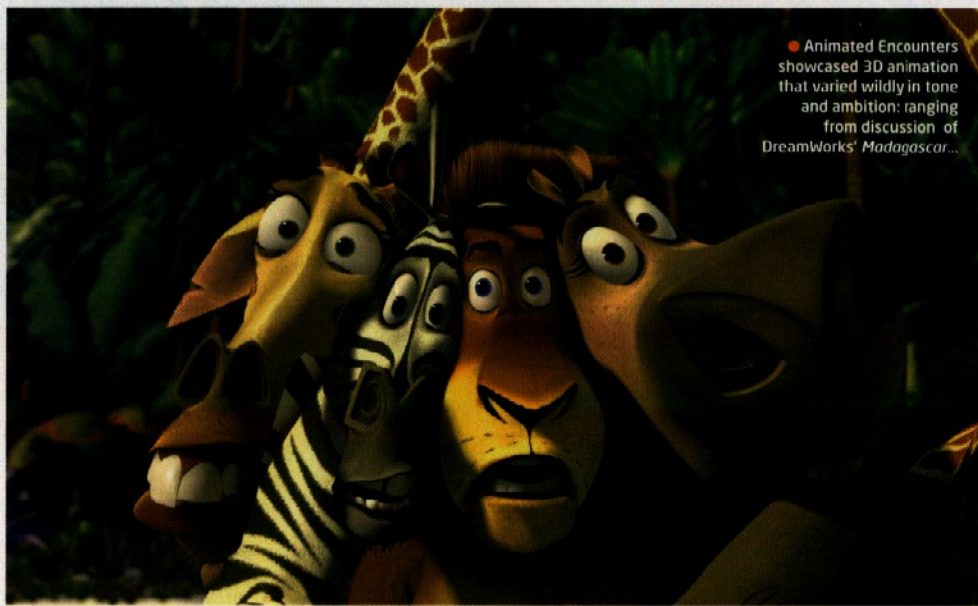
Animated Encounters International Animation Festival, which took place at Bristol's Watershed cinema and @Bristol's IMAX theatre between 21 and 24 April, is a low-key annual affair with something for people from all echelons of the 3D industry. Because of this, it's able to offer a level playing field in which student hopefuls can rub shoulders with 3D producers, animators, directors and even heads of studios. Featuring awards, conference sessions and special events like a sneak preview of the new Aardman/DreamWorks production, *Wallace & Gromit: The Curse of the Were-Rabbit*, the festival successfully covers many diverse areas of animation.

Sessions-wise, this year's Animated Encounters put together a varied programme, with panel discussions designed for high-flying programme funders all the way down to the job-seeking student. At the lower end of the scale, Showreel Surgery brought together a glittering panel from across the 3D industry (from DreamWorks' Shelley Page to Studio aka's Marc Craste, among many others) to offer tips on creating a reel, insight into the process of candidate selection, and to show excerpts from reels that exhibited the 'wow' factor necessary to thaw the all-but-frozen heart of the CG industry recruiter.

The main conclusions to be drawn from the discussion were that the 3D industry's small size means that having a job already is the best way to get a job, that a good reel will likely be passed around many companies, that being honest about your competence, being polite and having humility is a necessity, and that overridingly important rule – that "persistence" should never tip over into "stalking."

Over in the show's Business of Animation session, panelists identified the increasing importance of overseas funding when launching major UK-based productions, and the attendant implications for directors and series creators.

"The days of a colloquial British show being accepted into an international market are largely over," commented Cosgrove Hall's AJ Read – a phenomenon jokingly dubbed "the international biscuit crisis" in response to the headline 'Postman Pat eats cookies,' which appeared in the trade



● Animated Encounters showcased 3D animation that varied wildly in tone and ambition: ranging from discussion of DreamWorks' *Madagascar*...

press when the popular, but distinctly UK-centric, kids' TV show was picked up for American distribution.

This trend is amplified by the increasing influence of anime on the UK animation industry. "There's already a cultural stream that flows downhill from the US [to the UK]," commented HIT Entertainment's Chris Skala. "You'll soon see a commensurate stream that flows downhill from Japan."

"DREAMWORKS MAKES MOVIES FOR ADULTS, AND THE ADULT THAT EXISTS IN EVERY CHILD"

JEFFREY KATZENBERG, CO-FOUNDER, DREAMWORKS SKG

Jeffrey Katzenberg – DreamWorks supremo and the K in SKG (the Spielberg, Katzenberg, Geffen triumvirate behind the company), was the festival's keynote interviewee. Sitting in Bristol's plush IMAX 3D theatre, he was quizzed by Aardman Animations Co-Founder, David Sproxton. Perhaps a less partisan questioner would've given him a rougher workout on some of the issues raised, but this wasn't the

point of the session. Above all, Katzenberg's answers offered insight into life running a billion-dollar baby while somehow remaining down-to-earth and enthusiastic.

You'd be forgiven for thinking that someone in his position would long ago have viewed animated films only in terms of financial success, yet Katzenberg's love of the medium is genuine, whether recalling *Shrek* as "the moment

at which we finally found the Holy Grail of what made a DreamWorks animated movie," or neatly pinning down the DreamWorks formula as making "movies for adults, and the adult that exists in every child," or even offering advice for new CG start-up studios: "Have a great story – if you have a great story, everything else will come together."

His most animated moments came during discussion of whether the CG movie market is reaching saturation point: "Not even close, and not coming. For years," was his taut prediction. The session closed with an extensive audience Q&A, covering issues such as how the role of voice actors in animated movies differs in comparison to live-action work; Katzenberg's own day-to-day role at DreamWorks; and how the company survived the lean times.

Later that evening, Katzenberg discussed his ten favourite toons to take to a desert island in an onstage interview with journalist and film critic Mark Kermode.

www.animated-encounters.org.uk



● ... taking in Chris Landreth's breakthrough, Oscar-winning 3D documentary, *Ryan*...



● ... and handing a UK festival debut to Owen Simons's kids' short *Mischievous Mirrors*



WEBSITE OF THE MONTH

www.heavy.com

ENJOY THE CHILDISH DELIGHTS of *Pimp My Weapon*, a new Machinima series created by the Heavy.com broadband network and Sony to advertise upcoming PlayStation title *God of War*. In *Pimp My Weapon*, a muscular warrior character from the game called Kratos has, by way of an excellent voice-over, metamorphosed into Ron Johnson, the perky and enthusiastic host of a 'How To' series. Ron explains different ways we can Get to Know the Chain Sword with the help of long-suffering colleague Stan Grossman, whose complaints of a bruised coccyx and unpleasant burning sensations fall on deaf ears as Ron demonstrates how to master the art of Proper Leaping About, and takes us through the 'math' behind



how Two Chain Swords = Twice the Killing. Brilliantly childish fun - and proof that, unlike Stan Grossman, Machinima is alive and well. ●

Further sites...

<http://ex.cgchannel.com>

CG Channel eXchange is an online resource from the makers of CG Channel, aimed at helping 3D artists to market their 3D meshes, textures, shaders, scripts, freeware and other digital assets over the web.

www.apple.com/trailers/universal/serenity

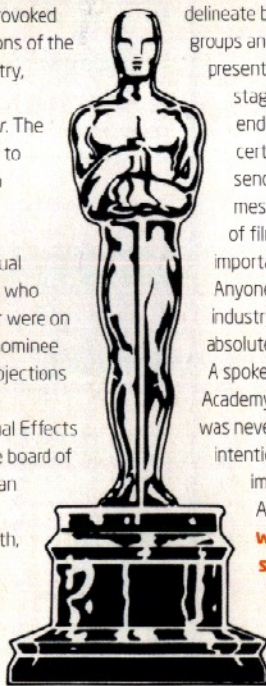
Joss Whedon's SF series *Firefly* hits the cinema as *Serenity*. Zoic and Rhythm and Hues provide the VFX.

3D OSCAR 'SNUB'?

TOYS, PRAM Oscars telecast branded 'demeaning' by 3D body

MEASURES TO speed up the Oscars ceremony provoked anger among sections of the visual effects industry, according to the *Hollywood Reporter*. The Academy's decision to award statuettes in some categories (including the Achievement in Visual Effects) to winners who remained seated, or were on stage as part of a nominee line-up, met with objections from the Executive Director of the Visual Effects Society and the the board of directors of American Cinema Editors.

An irate Eric Roth, VES Executive Director, contacted the Academy Awards Producer Gil Cates to



complain: "The decision to delineate between certain groups and branches by presenting awards either on stage or in the audience ended up demeaning certain crafts categories, sending the not-so-subtle message that some areas of filmmaking are more important than others. Anyone who works in our industry knows that this is absolutely untrue." A spokesperson for the Academy explained that it was never the organisation's intention to diminish the importance of any of the Award categories.

www.visualeffectsociety.com

● It's the Oscar for... erm... oh y'know... visual stuff... computers... what-ever

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Georg Finch
Senior Lecturer MA 3D Computer Animation,
Bournemouth University

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Avid
computer graphics

EVENT HORIZON



ONEDOTZERO 27 MAY-5 JUNE, LONDON

onedotzero's annual moving image festival gets underway at London's ICA, showcasing all that's fresh and exciting in the world of digital film, animation, game graphics and pop promos. Visit the site for the festival line-up.
www.onedotzero.com



VISIONFEST 2-5 JUNE, INDIANAPOLIS, USA

Students can meet industry pros, discuss work, exchange ideas, see films and party at this North American festival, which aims to foster and support the development of animation, new media and interactivity.
www.visionfest.org



SOHO SHORTS 30 JULY-5 AUG, LONDON, UK

If you're in Soho in August, you'll be able to see the best entrants to the seventh Rushes Soho Shorts Festival as they're played in the area's bars and cafés. The celebration of short films culminates in an awards show.
www.sohoshorts.com



SIGGRAPH 2005 31 JULY-4 AUG, L.A., USA

The 32nd SIGGRAPH festival is the biggest event in the industry calendar. George Lucas is giving this year's keynote address and Q&A session, and there's the usual line-up of must-see screenings, forums and talks.
www.siggraph.org



Hexagon shapes up

SOFTWARE Eovia adds a novel new polygonal modelling application to its 3D software range - but what does it offer that isn't already available out there?

Eovia, the developer behind *Carrara* and *Amapi*, has added to its line-up with *Hexagon*, a brand-new poly and Sub-D surface modeller. At a price point of around £179/\$340/€263, *Hexagon* offers a new approach to 3D modelling, which Eovia has designed with clarity and simplicity for beginners, and timesaving tools for experts, in mind. "Hexagon's unique selling point is that it offers multiple modelling techniques for different user levels," said Eovia's Stefan Blomberg. "Its tools make features available in an intelligent way. And this is an important point for the beginner; learners only need to use a few basic tools to start creating, and will have a feeling of success from the beginning."

Eovia also claims that *Hexagon* is the only modeller that "offers multiple modelling techniques at the same time",

with Subdivision modelling, surface modelling, and advanced 3D tools such as Booleans, thickness, filleting and dynamic construction history offering advanced 3D artists ways to optimise their workflow. *Hexagon* works with low-polygon techniques, supports UV mapping and exports to OBJ, 3DS, DXF, STL, DWG and Carrara formats.

But is the release an alternative to *Carrara*? Blomberg says not. "Hexagon is fully integrated into the *Carrara* product line. It will be a companion to *Carrara* but also to other 3D apps, such as *Bryce*, *Vue*, and *Strata*, and used by people who might not need *Carrara*. Plus, the next versions of *Carrara* will profit from *Hexagon*'s technologies."

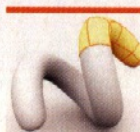
Hexagon will be available for Mac and PC. See the site below for demos and further details of the featureset.
www.eovia.com



● Eovia's new modelling application, *Hexagon*, works with low polygon and Sub-D techniques, supports UV mapping and exports to OBJ, 3DS, DXF, STL, DWG and Carrara formats. The company says it offers beginners a rewarding intro to 3D, alongside pro tools for experts

Production line

The month's other releases in brief



MODO DEMO

Head over to Luxology's site to try out a free version of *modo 102*, its poly and Subdivision surface modeller. The evaluation version offers free, unrestricted access. President Brad Peebler says the company "trusts the user community." How refreshing.

www.modo3d.com



MICROWAVE FOR MENTAL RAY

Evasion3D has released *Microwave*, its 'futuristic projective rendering system' for *Mental Ray*. The app is designed to turn any 3D scene into real-time 3D content regardless of scene complexity, or shading features applied. Its RRP is \$499.

www.evasion3d.com



ENDORPHIN RUSH

NaturalMotion has a new monthly licensing option for its dynamic motion synthesis application, *endorphin*. Entitled *endorphin Rush*, the programme will enable users to rent *endorphin 2* for \$1,595 per month; full support is included in the price.

www.naturalmotion.com



ALIENWARE MJ-12 7550A

Alienware's most powerful workstation to date has dual AMD Opteron processors, support for NVIDIA SLI Graphics and a sleek new chassis design. The MJ-12 7550A features support for extremely clever dual PCI Express graphics.

www.alienware.com

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MAXON

Projects round-up

Hair gremlins, retro 3D, motion graphics, preschool animation and hi-tech water

01 GLASSWORKS SUNSILK AD

The latest ad for Sunsilk shampoo gives the phrase 'bad hair day' new meaning, as three bizarre monsters play havoc with a woman's barnet. Glassworks used its character animation and hair simulation skills on the ad, working from a character design by *Star Wars* artist Sang Jung Lee. "We used *XSI* with in-house software for the spikes on the spiky monster," says producer Jonathan Davies. "The biggest challenge, and the thing we spent most time on, was the design of the characters. Renders were long, but that isn't really a challenge, other than a challenge of patience."

www.glassworks.co.uk

02 PLAID VIDEO BY GELMAN

CaretStick is the latest release from electronic musos Plaid, aka Ed Handley and Andy Turner. The entire 220-second video for the track is based on a continuously moving chainlink fence in 3D - both the CG variety and traditional stereoscopic kind. Director Alexander Gelman and his team used *Maya*, *After Effects* and *Smoke*. "I like artificial environments that don't try to mimic reality; environments that are confident enough to exist in their own right," he says. "At the same time, I was drawn by the nostalgic low-tech quality of anaglyphic 3D."

www.designmachine.net

03 ONYRO'S FISCHERSPOONER VIDEO PLAYER

The launch of Fischerspooner's latest album *Odyssey*, more than two years after their debut, *#1*, has been accompanied by a flurry of publicity. As part of this, Greek design agency Onyro created a customised *Flash* media player for record label EMI, as well as a frenetic 3D sting of the band's logo indulging in some psychedelic tumblings. "We used *Softimage|XSI* for the rendering and animation, and then *After Effects* for loads of motion-blurring and compositing," says Onyro's Creative Director, Ant Kyriazis.

www.onyro.com

04 BIRD BATH SERIES BY IMPOSSIBLE TV

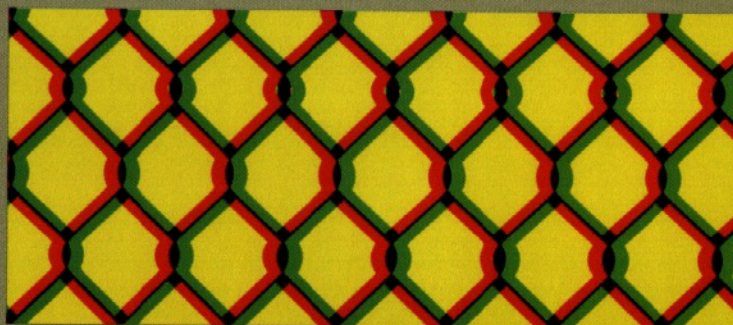
Newly independent from previous owners Granada, Impossible TV is celebrating its freedom with a new series for preschoolers. *Bird Bath* consists of two 30-episode series for Channel Five, and is due later this year. Despite the tight timeframe, Impossible TV's Peter Scott says the series is "more generous in schedule than anything we've made. *Bird Bath* is a more limited environment, and combined with the extra time, it means it looks top-notch." The team is using *3ds max* and *character studio* for the birds themselves, and *Photoshop* and *After Effects* for textures.

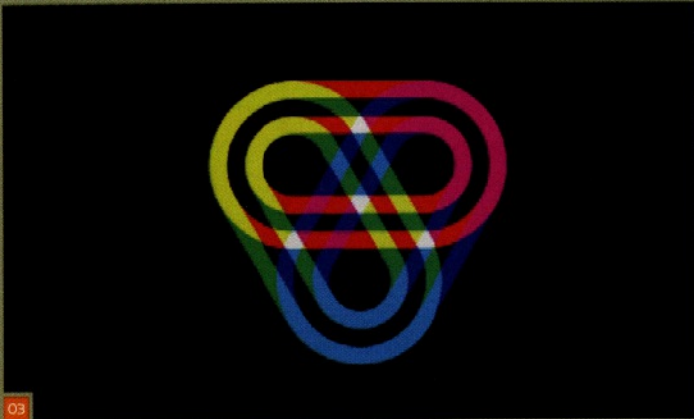
www.impossibletv.com

05 BANG & OLUFSEN AD CG BY ONE POST

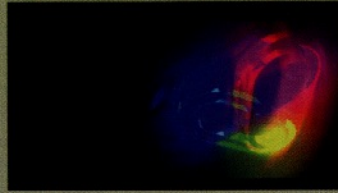
Bang & Olufsen's newest TV spot, *Learn to Listen*, features a musician filling a glass of water by sound alone - because, as it turns out, he's blind. Directed by the Shammasian Brothers at Godman, the ad blends high-speed footage filmed on a new ARRI camera and CG water droplets created at One Post. Head of 3D Dave Child was the lead: "We created the photo-real water droplets using *Maya*, and then Richie White composited these into the shots and gave them depth of field," he says. "They don't look synthetic, and we are very happy with that."

www.onepost.tv





03



04



05



● A still from Ebenezer Morgan's *Photography Emporium* by Jaime Pardo and Tia Perkins. The duo were, in their own words, "let out of our gimp cupboard" for the SE3D showcase event

SE3D showcase

EVENT First fruits of experimental online Maya rendering service for indie animators screened at Bristol's Animated Encounters festival



Twelve teams of British animators were "let out of their gimp cupboards" at Bristol's recent Animated Encounters festival to preview an innovative new online service

intended to put the rendering power of a major CG studio into the hands of independent artists.

The films in the SE3D showcase, co-sponsored by HP and Alias, will be among the first products of HP Labs' new Maya Rendering Service, which functions as an out-of-house render farm.

According to former Aardman animator Dan Lane, whose short, *Two Fellas*, was one of the few films in the showcase completed at the time of the screening: "[The service] brings smaller companies into a different way of working. Instead of having to set up and maintain a whole load of kit, I can just call HP and rent it for a couple of weeks. Rendering then becomes a utility, like electricity or gas."

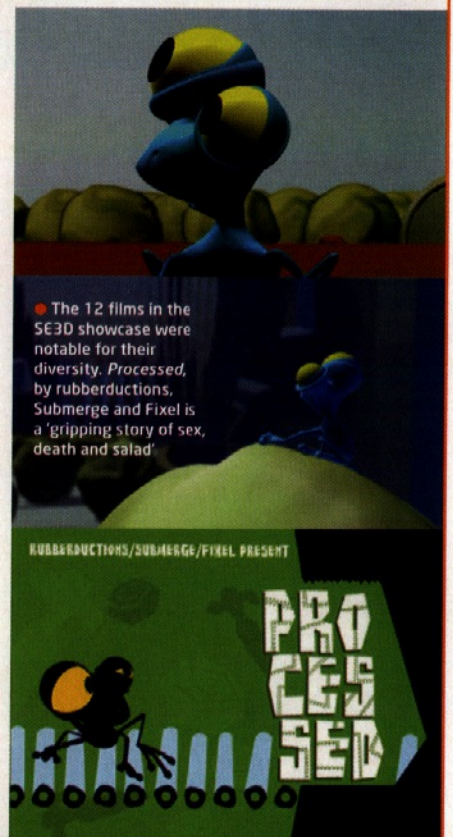
Unlike existing internet render services such as ResPower, the scheme works on a 'trickle bidding'

system, described by HP's Stephen Hinde as "a bit like eBay for computing". Time on the render farm is divided into one-hour slots, for which animators tender bids for their projects. The sender of the highest offer gets their renders processed.

However, panellists who spoke at the show downplayed suggestions that this way of working would force animators to make creative choices based on purely financial criteria, comparing the process to that of booking slots for a studio's in-house facilities. "Ultimately, it's just a render farm," commented Lane, a long-time *Maya* animator. "It does exactly what it says on the tin."

The remaining short films in the SE3D showcase are now on course to be completed in time for screenings at the Cannes and Annecy festivals. At the time this issue went to press, neither HP nor Alias had confirmed a commercial roll-out for the service, which is described as "still very experimental". Back in the gimp cupboards then, chaps.

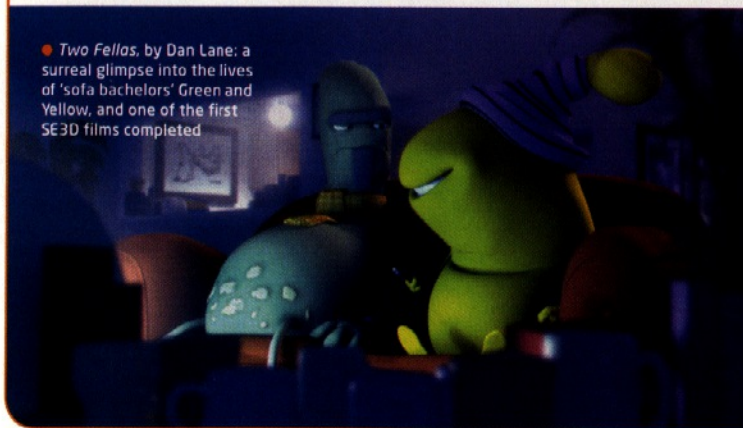
[w] www.dshed.net/se3d



● The 12 films in the SE3D showcase were notable for their diversity. *Processed*, by rubberductions, *Submerge* and *Fixel* is a 'gripping story of sex, death and salad'

● *Two Fellas*, by Dan Lane: a surreal glimpse into the lives of 'sofa bachelors' Green and Yellow, and one of the first SE3D films completed

● Screenburn Limited's *Little Angel*. All the films were rendered in *Maya* via HP's URS system, without mental ray





Letter from Hollywood



I've spent 15 years in London, and now seven years in LA; recently I spent another week in London. In the time I've been away, the number of people doing CG in Soho has gone from maybe two dozen to over 1,000. The facilities there

are working on A-list Hollywood films, and doing first-class work. But there are interesting differences between the London strategies and those of Hollywood.

Broadly, it seems that the distinguishing characteristic of the large Hollywood facilities is a willingness to create their own tools. Whether they've been writing new renderers, new compositors, simulation tools or modelling tools, the thing that marks out places such as ILM, Digital Domain, Blue Sky and the rest is that they've spent lots of time and money creating their own technology: both because they needed to and because they wanted to distinguish themselves from their competitors.

In London, however, apart from developing pipeline tools, everyone I talked to seemed unwilling to support a staff devoted to creating custom technology - and there are good reasons for this. For one thing, it's easier to make money if you let other people do the open-ended work of software development. For another, there's arguably less invention required now, as the vast majority of the tools people need can be bought, and prices keep dropping while functionality keeps going up. Finally, many of the

Custom conundrum

Craig Zerouni of Side Effects asks: is London's dismissive attitude to custom software development a symptom of an inevitable trend - and will VFX become a commodity business?

London facilities grew up out of television post-production houses, where there's absolutely no history of developing software. The TV model is to buy equipment, decorate the room, and start the meter running. Films don't work like this - at least not yet. That may change, because the history of technology is that things go from difficult and expensive to cheap commodities. Consider the simple PC. Once, they were expensive, and profitable to sell. Now, they're cheap - and only Dell seems able to make a profit selling them. Similarly, once upon a time only ILM could be trusted to produce feature film effects, so ILM could charge useful amounts of money. Now, studios are completely willing to trust six guys in a garage to produce shots, and the pressure to make the process faster and cheaper is relentless. In a world like that, the television post-production model may well turn out to be the winning strategy.

But are we there yet? While even the large Hollywood facilities have cut back on the amount of custom development they do, none of them feels secure enough to stop doing it altogether. It seems as if they're playing a longer game, and the name of that game is still to push for more spectacle, more things that people haven't seen before, more control for directors, while also attempting to go faster and charge less. Sony, for example, seems to be thinking not just about how to get through 2005, but about what it will need to achieve world domination at some point several years after that. And it's not just Sony: all of these companies are engaged in a struggle to stay out of a commodity business. If what you do is indistinguishable from what everyone else does, then you're only able to compete on price - and that's not a business model most people want to be part of.

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Avid
computer graphics

Chemical Brothers 'Believe'

The Chemical Brothers dance the body electric - and freak out a hallucinating worker - in a darkly comic promo starring a menacing robot created at Framestore CFC **BY MARK RAMSHAW**

The faceless nature of so many contemporary dance music artists has prompted record labels to turn to 3D animation and effects to add dynamism to their music videos. While the Chemical Brothers don't quite fit into the 'anonymous' category, they've done more than most to explore the possibilities of CG, most spectacularly in promos for the songs *Star Guitar*, *Get Yourself High* and *Hey Boy, Hey Girl*. Their latest addition to the list is *Believe*, a superb combination of live footage and CG elements created at Framestore CFC.

The promo follows a car plant worker as his mundane job and humdrum life dramatically clash when he starts to catch sight of a robotic armature from the factory running loose around the streets of London. With flawlessly integrated CG elements and frenetic hand-held camerawork, the promo packs a powerful punch. Those energetic camera moves were made possible by the use of a DV video camera, and CG elements were inserted directly without the use of bluescreen.

"The Directors, Dom & Nic, really liked a test we created for a European Renault commercial, where we'd been able to shoot footage in the morning and then have CG in there by the afternoon," explains Jamie Isles, Senior Technical Director and Animator at Framestore CFC. "Using portable DV equipment rather than 35mm really gave them freedom. They could just go out and shoot what they wanted; all we needed was lighting ball reference to match into the scenes."

The use of DV did, however, make working in overcast conditions for much of the six-day shoot something of an issue. "The plates initially looked quite bland," Isles says. "They lacked range, with an absence of strong blacks and extreme whites. It took some work to put that range in, a make everything appear more dynamic." Both a mirrorball and white ball were used for the lighting reference. "They didn't use proper high-dynamic range on this, just *Maya* Hypershade with five bracketed exposures from a fish-eye lens multiplied together," says Isles. "The reference data was really just a starting point, though. We had to get through four shots a day, so it was really just a case of adding whatever worked for each particular shot. In addition

to the image-based lighting we'd add a couple of lights to burn out the sky and add a bit of backlight, and then test to see what else was needed to match the objects into each scene, such as a little bit of rimlight." The team didn't get to visit the MG Rover plant eventually selected for the shoot (20 other factories refused to help out) until mid-way through the production schedule, so work began on the robot design a couple of weeks earlier. Isles says: "The final look of the main arm, which effectively forms the torso and head, came out of that trip. We also got some nice references to help add realism, including things like little warning signs to stick on the robot."

ROBO POP

Although the robot design evolved during the course of the project, a rig was built from the original roughly blocked model, enabling the animators to get working immediately. Texture detail - both hand-drawn and procedurally generated - was also added before the model was complete.

"As the model was getting close to finished I'd take it and place some UVs on it, placing dirt textures on the larger areas and adding detail on top for scratches," says Isles. "Sometimes it's difficult to get moving when things are still being fine-tuned, but we had good communication, and the rigging was very rigidly bound, so we were able to easily clip things in." With just two weeks to work on more than 30 CG-augmented shots, efficient compositing was also crucial. In fact just three passes were handed over - the beauty pass, the shadow pass, and a multi-light pass that gave extra grading control. By way of contrast, many of the studio's previous projects have involved up to 14 passes.

Had *Believe* been a million-dollar affair, it would still have been remarkable. That such an engaging, visually convincing promo was produced with such pared-down filmmaking and post-production techniques is nothing short of incredible.

You can watch the *Believe* video, read the credits and find out more about its production at: [w] www.framestore-cfc.com/commercials/chemical_brothers/index.html

DETAILS

TITLE

Believe

PRODUCTION COMPANY

Factory Films

DIRECTORS

Dom & Nic

RUNNING TIME

262 seconds

FIRST BROADCAST

18 March 2005

WEBSITE

www.framestore-cfc.com

TEAM SIZE

17

TIME TAKEN

Six weeks

SOFTWARE USED

Maya, *mental ray*, *Inferno*

FREEZE FRAME

A young man stares at leotard-clad dancers on a TV in a shop window. One of the girls, her face contorted, screams directly at him. Perturbed, he heads off to his job at a car plant. On his way home he sees one of the assembly robots from the factory drinking out of a river; back at home, the robot bursts through the bathroom window. Sightings of the robot become more frequent, until it chases the man on to a car park rooftop. The robot disappears as it seems poised to strike, but when the man returns to the street several robots close in, beams of light shoot from traffic lights and buildings seem to tumble. The final shot sees the man sitting in the street, laughing manically.

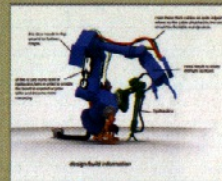


IN FOCUS | How Framestore CFC bolted together its disturbingly life-like robotic hallucinations

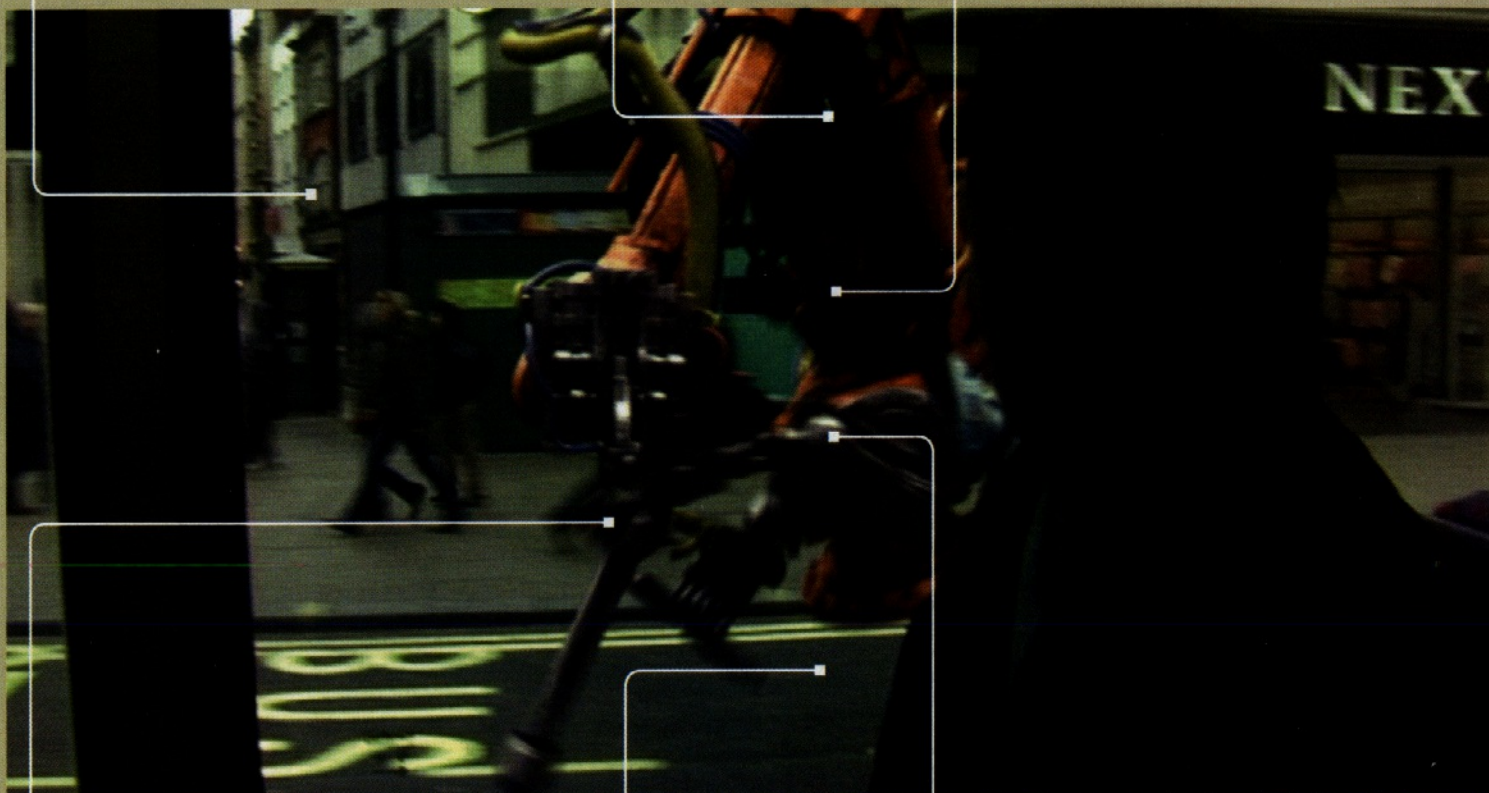


01 The initial storyboard for a sequence in which the robot chases after a bus. "Because no bluescreen was needed, directors Dom & Nic could just go right out and shoot anything," says Jamie Isles. "DV also made things cost effective."

02 "We used Dirtmap occlusion in *mental ray*, adding procedural noise to create the look of oily dirt around any areas of contact," says Isles. "We thought about using procedural texturing, but the results would've been too clean."



03 "The robot was designed by Alex Doyle," says Isles. "Normally, the actual factory robot would provide the starting point, but he had to begin the design before any recce work was done, making a few changes after visiting the car plant."

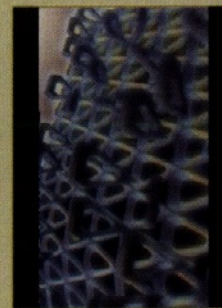


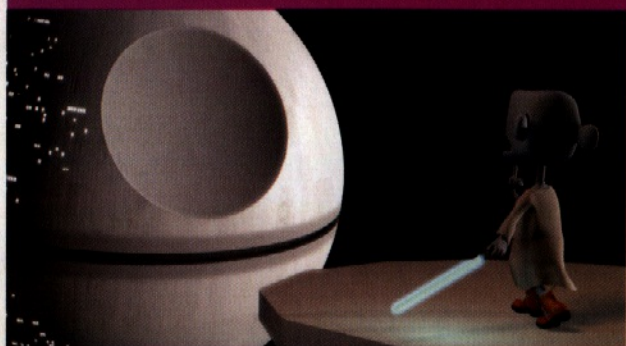
04 A view of the robot in wireframe, with the cabling detail visible in dark blue. "The cabling at the rear was hand-animated, but for the cabling that wrapped around the robot we made use of *Maya Hair*," explains Isles.

05 "One of the animators came up with a run cycle where the robot sports a sort of injured wobble, which became the blueprint for the main run," says Isles. "In most of the scenes, the robot's animation is built on that cycle."



06 The menacing car plant robot model, fully lit and ready for motion blur. For this project Framestore CFC decided to pair *Maya* with *mental ray*. "For lighting reference we worked with a white ball and a mirrorball," says Isles.





MeNTaL RoY

Resident columnist and 3D menial droid **Mental Roy** is puzzled. How has George Lucas's Jedi Mind Trick managed to persuade everyone that the new Star Wars films are anything more worthy than vapid vehicles for visual effects magic?



THE NEW STAR WARS It's just not very good is it? There - I've said it. And believe me, it takes the guts of a Princess Leia in Bounty Hunter Disguise [TM] to say that round these parts - it's an opinion that pretty much puts me in a minority of one. There are fans of *Star Trek*, and they are known as 'Trekkers'. There are fans of *Red Dwarf*, and they are known as 'Dwarfers'.

There are even, it is rumoured, fans of *Firefly*, and they are known as 'wankers'. And then there are fans of *Star Wars*, and they are known as 'the entire 3D animation community'. Yet it's plain to see these *Star Wars* fans are easily impressed, and that they'll be back - in greater numbers.

Don't get me wrong. I don't hate *Star Wars*. I grew up with it. I had Yoda's face on my lunchbox, for crying out loud; and Jedi mastery notwithstanding, can you imagine anything more likely to put you off your Pepperami? But since the phenomenal success of the first three films, has no-one had the balls to say: "George... could the lads just have a quiet word?" As the trilogy is at pains to point out, the greater your power and the more expansive your Empire, the more clouded your judgement becomes. And yet the warning signs were there all along - the Care Bear fights, the tacky ending, Frank Sidebottom piloting the Millennium Falcon...

And they're JUST FILMS. They're not life events. They're not something you should sit around discussing in the pub afterwards for hour after sodding hour. You want evidence? Let's leap back six years. *Episode I* has just opened in London. Half of Soho crams into the Odeon Leicester Square to see it. The curtains open, the credits roll, the music plays and then... *The Phantom Menace* spatters apologetically across our retinas.

Rarely has such frenzied anticipation given way to a more overwhelming feeling of sleazy disappointment - even in Soho's darkened rooms. And since so many insults have been heaped on Jar Jar Binks, it'd be pointless to invent new ones for the FLOPPY-EARED STEREOTYPE. So let's recall some highlights from the rest of the movie instead. Those dog-on-a-string haired Jedi knights. That droid army resembling a toilet bleach that 'cleans below the rim'. The Sith Lord with a ludicrous spray-on tiger face. Yoda's sideburns. The s-l-o-w exposition. The hokey religion. Ewan McGuinness. What tripe.

Okay, so the second movie is better. But it's not *War and Peace* - which, by the way, they managed to film in under 210 minutes. *Star Wars* is up to 655 so far, and it's STILL... not... DONE yet. And all the digital wizardry on Degobah can't hide the fact that Episodes I and II are expensive in-game cutscenes in search of a plot. Clearly, only two groups of people needed the backstory from the original trilogy filling in for them: obsessives and toy makers. And I don't particularly want to hang out with either of them.

Ask yourselves: how much job satisfaction can there be in crafting a finely nuanced character animation or a revolutionary new particle shader, when at the back of your mind there's the nagging suspicion that all the filmmakers actually need to do is hire a couple of overpaid British thespians, give them ninja glowsticks, sit back and watch people queue around the block to see the results. Just because it's *Star Wars*.

When the Sith finally hits the fans, I'll be elsewhere. And when I do see *Episode III*, it'll be on TV at Christmas, after mum's lightsabred the turkey, but before the row over who the father of Cousin Tracey's baby is. "Tracey - there is another..." And then, like Cousin Tracey's baby, we're not going to talk about it again. For a very long time.

**WHEN THE SITH
FINALLY HITS
THE FANS, I'LL
BE ELSEWHERE**

PLUGGED IN

SONY MIND CONTROL

Videogames of the future could directly alter your brain cortex to induce sensory experiences - that's the inference that many reporters are making, based on a recent U.S. patent granted to Sony. Any devices based on the techniques in the patent would have huge and wide-ranging potential, not least for those people who are blind or deaf.

[w] www.sony.com



GLOBAL ILLUMINATION #02

Key stats and trends from the 3D industry in specific countries. This issue: **China**

The cost of labour in China is one of the lowest in the world. This, coupled with the territory's large pool of animators, is attracting animation outsourcing to China. In fact, the country probably has the largest number of animators in the world, and the country is attracting large numbers of post-production jobs. The largest studios in the country are Wang Films and Hong Ying, both based in Suzhou; the pair are actually Taiwan-based animation studios with large-scale operations in China. Other large studios include Shanghai Animation, Shanghai Morning Sun, Animation Services Hong Kong, Jade Animation and Colorland Animation.

However, due to the lack of supply of local content, the Chinese TV channels are reliant on imported animation content, and Japanese animation productions rank highest in popularity. The other popular animation programmes include Hollywood productions such as *Tom & Jerry*, *Mickey Mouse*, *Donald Duck* and so on. The quality of homegrown Chinese animation content is an area of concern and hence, Chinese animation is not yet as popular with the viewers as the various imported animation shows.

This data was provided by Digital Vector, a research and consultancy firm providing reports on aspects of the global animation industry. Visit www.digital-vector.com for more info.

● About 20,000 minutes of animated films and TV programs are produced by animation studios in China

● In China, there are about eight medium-to-large studios as well as about 100 small studios

● A number of animated films are imported from countries such as the US and Japan. Foreign animation films dominate the market with more than 60% of television animation being of foreign origin

● The Chinese animation industry is concentrated around Shanghai, as well as the small town of Suzhou



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● The pièce de résistance of *Star Wars: Episode III* is the Jedi-hunting droid army commander General Grievous: an all-CG cyborg, and a kind of beta version of the wicked Darth Vader

FACTFILE

PROJECT

Star Wars: Episode III - Revenge of the Sith

EFFECTS HOUSE

Industrial Light & Magic

SELECTED CREDITS

Star Wars: Episode I - The Phantom Menace (1999); *Artificial Intelligence: AI* (2001); *The Mummy Returns* (2001); *Star Wars: Episode II - Attack of the Clones* (2002); *Harry Potter and the Goblet of Fire* (2005); *War of the Worlds* (2005); *Indiana Jones 4* (2006);

WEBSITE

www.ilm.com

PROJECT DURATION

30 months

PROJECT TEAM SIZE

350

BUDGET

\$115 million

SOFTWARE USED

Maya, Photoshop, RenderMan, 3ds max, Brazil, in-house tools

INSIDE EPISODE III

star wars

On 1 November 2002, Industrial Light & Magic began work on its biggest effects project to date.

Thirty months, ninety minutes of animation, and some 6,598,928 hours of rendering time later, Star Wars: Episode III - Revenge of the Sith is finally complete. As fans gather to bid farewell to the most successful film franchise of all time, 3D World went behind the scenes at ILM to uncover the real secrets of the Clone Wars, Anakin Skywalker's conversion to the dark side, and Obi-Wan Kenobi's battle with new all-CG arch-villain General Grievous. As part of our Star Wars special, we investigate the advances in digital workflow, cloth simulation and character rigging powering the movie's 2,151 VFX shots - and reveal exactly what it is that makes the General's 'disgusting bits' pulsate...

BY BARBARA ROBERTSON



● The opening space battle is the longest of any *Star Wars* episode, and includes, for the first time, huge ships in addition to small fighters

Bigger, longer and more ambitious than ever, *Star Wars: Episode III - Revenge of the Sith* marks the final chapter in director George Lucas' six-part story of intergalactic war and peace. The science-fiction epic has become the most successful film franchise of all time, with box office and merchandising revenues from the first five films already totalling billions of dollars. *Episode III*, which opens on 19 May, will take that figure higher, as fans say hello to a new set of visual effects, and goodbye to a legend.

From the beginning, *Star Wars* and visual effects have been synonymous. Each of the films has made VFX history, including

“Of the 2,000-odd visual effects shots in *Episode III*, over 1,000 include animation. We've passed the length of an animated feature.”

ROB COLEMAN, ANIMATION DIRECTOR

the first, the 1977 film now named *Star Wars: Episode IV - A New Hope*. All told, the first five Episodes have won three Oscars, one BAFTA, and two Oscar nominations for best visual effects. All of these effects were crafted at Lucas' own studio, Industrial Light & Magic (ILM), an unbroken track record that has been continued with *Episode III*.

● A script developed within *Maya* automatically placed pilots in position, and constrained the character rig so that a pilot's hand moved with the steering mechanism

With *Episode I - The Phantom Menace* (the first in the new trilogy of films) Lucas began pushing ILM to create record numbers of digital characters and scenes. For it, the studio completed nearly 2,000 shots, many of which involved multiple CG characters: a record number at the time. As Lucas moved into digital cinema with *Episode II - Attack of the Clones*, the effects grew to include more sophisticated digital doubles and a digital version of Yoda, originally a puppet controlled by the legendary Frank Oz. *Episode III* brings Yoda closer to camera, adds even more digital doubles and environments, casts new types of clones and droids, and re-introduces digital versions of characters from earlier films, such as the Wookiees. The *pièce de résistance*, however, is the movie's arch villain: the four-armed, all-CG General Grievous. A “twisted melding of flesh and metal”, the Jedi-hunting Grievous is not merely a formidable foe for Obi-Wan and his allies, but a major technical achievement.

The increasing scope of the digital effects has also led to an increase in total screen time for CG animation. Where *Episode I* contained 60 minutes of animation, *Episode II* had 70 minutes, and *Episode III* contains a full 90 minutes: “We've passed the length of an animated feature,” says Animation Director Rob Coleman. “Of the 2,000-odd [visual effects] shots, over 1,000 include animation.” At the peak of the work, which fell during the spring and summer of 2004, 40 animators worked on the shots; during the rest of production the number ranged between 30 and 33. All told, around 185 digital creatures appear in the movie.

And yet, unlike the previous films, the technical challenges of *Episode III* weren't primarily novel: “This time, we haven't had as many cases where we hadn't done something before,” says Visual Effects Supervisor John Knoll, who managed 1,700 of the 2,151 VFX shots. “The challenges have been in doing things more efficiently while retaining the quality of the work.”

DUPLICATE DOUBLES

James Tooley, who oversaw rigging for the creatures, spaceships and props, was at the centre of this efficiency drive. It was his crew that devised tools to ready characters for animation as quickly as possible. This included both new characters and the returning stars: although the crew repurposed models for digital doubles of the actors re-appearing in this film, the models still had to be re-rigged.

IN FOCUS | From puppet to pixels: Yoda's journey to the digital side...

Not all of *Episode III*'s digital characters had to be created from scratch. In particular, one old audience favourite - and *3D World* cover star - had made his digital debut in *Episode II*, having previously existed only as a physical model controlled by puppeteer Frank Oz. This time, however, he posed a whole new set of VFX challenges: "We spend a lot of time with Yoda [in *Episode III*]," says Animation Director Rob Coleman. Even his hands feature in close-ups, revealing little tufts of hair on his knuckles.

In order to withstand this close scrutiny, ILM's award-winning subsurface scattering algorithms were employed to make his skin more realistic - which, for this little old wizard, meant looking more like the original puppet.

"You can also see translucency in his ears," says Coleman. "Light is handled on the skin surface with Ambient Occlusion and Depth maps - and all that control of illumination has made a dramatic difference. We also have breathing and swallowing neck shapes, and his eyes are remarkable." For the eyes, the team switched from random eye scans to specific movements. "We watched a clip of Ewan [McGregor] when he was thinking," says Coleman. "We tried to execute eye movements for Yoda in that same thoughtful way."

This attention to detail extended not only to the character, but also to his clothing. By *Episode III*, the team had become adept enough with ILM's cloth-simulation engine to use it to give Yoda's cloak an 'emotional' performance.

"We wanted to emphasise the action at certain points of the animation, but with motion-blur we might have lost it," says Creature Simulation Supervisor Juan Luis Sanchez. This created an emotional subtext for Yoda's performance

during his battle against Sidious. When he was in control, the team used the movement of the cloak to reflect this; when he was losing, the cloak became more out of control, flapping around, falling off him and working against him.

Special shaders created by the TDs gave the cloak a fuzzy look. "They glued little bits of [digital] hair to the cloth," says Sanchez. But despite all of the technical refinements, one of Yoda's crucial characteristics, the underlying structure of his body, remained largely unchanged - for very pragmatic reasons: "He's pretty much the *Episode II* model," reveals rigging guru James Tooley. "We wanted to reuse some of the old animations."

"We now have a very different approach to the way we control animation and work with motion capture than for creatures like Jar Jar in *Episode I*," says Creature Supervisor Aaron Ferguson. "Plus, we used *Softimage|3D 3.5* on *Episode II* and now we're using *Maya* and in-house tools." And no matter whether the creature was new or one that had appeared in a previous film, the animators wanted to use the constraints, FK and IK blending, interaction with rigid body simulations, and so forth in the newer software. The old rigs wouldn't do.

"We tried to streamline all the digital doubles so that when we were ready to build a creature, we could push a button and get all the bones," says Tooley. "They would then move into position inside the geometry, completely rigged and ready to go. As long as the character was bipedal, it would work. It even worked for some of the new clones."

For an interface, the crew used photographs of the creature or character being built; each had its own GUI generator. The character was pictured on screen with icons on the side that allowed the crew to make detailed adjustments: "Other companies do similar things, but we built our own version [of the interface]," says Tooley. "We take a front view from any rendered turntable, or a photo of a maquette, or a photo of an actor; any kind of 2D pixels. Then we drag boxes onto the photos that give the user buttons. When someone using the system taps on a button, code is activated that automatically selects particular control mechanisms and switches to rotation and translation automatically."



● Because the space battle happens in the atmosphere above Coruscant rather than in outer space, it's the first to have fiery explosions



● Although some live-action elements were incorporated into the composites, the space battle sequence is almost entirely CG

● Because the opening space battle sequence featured hundreds of ships, ILM developed an "auto-pilot" system to populate the fighters with crews



Because the characters are symmetrical, the crew could move the pivot points on only half the body – the left shoulder and knee, for example – and apply the result to the other half automatically. Once the pivot points were repositioned, thus positioning the bones, a TD could hit a button and all the rigging and IK solvers would pop on automatically. "We'd start with Obi-Wan's geometry, his size and shape, and then move the pivot points to fit Anakin and the other characters," says Tooley.

"With a movie like *Star Wars: Episode III*, people come onto the crew with fond childhood memories and a real excitement about the film. We don't have to work to build a culture – they're passionate and interested in doing it right."

AARON FERGUSON, CREATURE SUPERVISOR

The TDs used the same system to rig the various types of clones. The skinning for the characters was integrated into *Maya* so that what the animator saw would match what later emerged at the other end of the production pipeline. This was important because in *Episode III*, the clone troopers on each planet have distinctive armour and weaponry and speciality clones such as paratroopers



● Yoda's model was "repurposed" from *Episode II*; however, his skin was improved using new lighting tools such as Subsurface Scattering

and pilots had different uniforms. The pilots' uniforms, for example, were equipped with hoses similar to those of the fighter pilots in *Episode IV*.

As with the digital doubles, the clones were animated with the help of motion-capture data. New tools and techniques enabled the crew to apply walk cycles from one clone to many others: "Certain parts of the rig let us refit motion-capture to a variety of creatures," says Ferguson. "We wanted to be able to fill scenes with people doing interesting things without spending a huge amount of time and energy." Previously, because the models didn't share structural or naming conventions, most animations had to be created individually.

THE BEGINNING OF THE END

Episode III opens with a huge space battle, which, at 2,000 frames, is the longest shot in the movie. Unlike previous episodes in the saga, the sequence actually shows mile-long ships engaging each other in combat – and the sequence is entirely computer-generated.

Tim Naylor, the chaining lead for the movie (who developed the photo-based rigging GUI) also developed a system for quickly populating spaceships with pilots. "We had hundreds of ships so we had to crew them in a quick and simple way," says Tooley. With the scripts Naylor created, TDs could import characters as needed into *Maya*, click a button and see which characters were in a particular shot during the battle. The system knew which pilots belonged in which spaceships, put them into position into a default pose, and constrained them so that when a steering

● Droids were animated with motion capture data until 'sliced and diced', then rigid body simulations took over



IN FOCUS | Grievous bodily charm: the making of a Jedi-hunter



01 Grievous walks in various ways - in a crouch, as a biped, and on his hands with his legs in the air, so rigging accommodated pistons and levers that needed to work in unison. The intricate rig gave animators control of his 200 articulating joints.

02 The skull-like quality of General Grievous's head was partly due to the use of ILM's award-winning subsurface scattering rendering algorithms. Grievous's lack of facial features meant that animators relied on posing to convey emotion.



03 Grievous' droid-like chest has a glass sack suspended inside that contains his organic structure - the lungs and tubes that keep him alive. Dynamic simulations give his guts, neck tubes and eye goo a more organic look and feel.



04 The creature was rigged to have four arms in every shot. The rigs were constrained to move the body armour away from his arms automatically so that no interpenetrations occurred as animators twisted his body.

05 The model was designed so that, during a fight, a rigid body simulation could animate parts that had been cut off. The model was made of 4,591 NURBS surfaces for a total of 435,186 CVs.



06 The cloth simulation team hooked the General's cape on spikes sticking out from his elbows to make him more menacing. They used a system of constraints called 'digital Velcro' to pull it as the character moved his hand.

An insect-like biped, the evil General Grievous is part animal, part machine. His narrow head looks as if it's made of old ivory, while his body is a disturbing hybrid of soft intestine-like guts and hard piston-like joints. A bounty hunter preying on Jedi, the all-digital General plays a major role in *Episode III* and played an equally major role during production.

"General Grievous was by far our most complicated character," says James Tooley, who oversaw the character rigging. "The model was made to look cool, and his look was very specific. We couldn't change the geometry." This created something of a problem for the rigging team, as Grievous's posture changes dramatically throughout the film. In early scenes, he is hunched over, exposing only two of his four arms: a meek yet sinister presence. But when he fights Obi-Wan, he straightens up, revealing all his limbs.

"Each section of his armour had to move independently so there were no interpenetrations as he twisted his body around when animators put him into poses," says Tooley. "He had lots of articulating bits. The pieces of his body that get cut apart also had to be set up for rigid body simulations."

In contrast, the soft organic parts of Grievous's body were animated procedurally, using simulations: "He has a glass sack inside his chest that's suspended in some sort of fluid," says Creature Simulation Supervisor Juan Luis Sanchez. "It was built to look like lungs and has tubes that keep him alive. We wanted to see them pulsating and looking disgusting."

A cloth simulation engine made the disgusting bits pulse. "We basically built a polymesh for the pieces of geometry inside him," says Sanchez. To control the simulation, the crew used tools called 'tacks,' which

affect the dynamics in particular areas of the polymesh. Painted texture maps positioned the tacks and described the area they encompassed. "It looks extremely gross," says Sanchez. "Because we simulate them all together, we use a self-propulsion method that keeps the meshes from intersecting with themselves, and that makes them jostle each other as they're pulsating."

And if the awkward armour, two hidden arms, and pulsating guts weren't enough for the production crew, the creature also wore a cape. Initially, the cloth dragged on the ground when Grievous hunched over, making him look like "a kid playing dress-up".

To make him more sinister, the crew took advantage of the angular spikes that stick out from his elbows: "We found if we hooked the cape over them, it allowed you to see his body," says Sanchez. "He looked like a general and you could see the menace."



● Yoda and the Wookies meet on Kashyyyk, the Wookies' home planet. In this image, the Wookies aren't computer generated; Yoda and the landscape are

"Certain parts of the rig let us refit motion capture to a variety of creatures. We wanted to be able to fill scenes with people doing interesting things without spending a huge amount of time and energy."

AARON FERGUSON, CREATURE SUPERVISOR

mechanism moved, the pilot's hand would move, too. In addition to the special pilot rigs, the chaining crew created rigging subscripts that helped them quickly build lightsabers and blasters for the clone troopers and other characters. "Lightsabers have special constraints," says Tooley. "Animators could animate a hand and have the lightsaber follow, or do the opposite. Sometimes, one character dropped a weapon and another picked it up. So, even though part of the character was constrained in one way, he could still let the weapon go and another character could grab it in the same shot." Sometimes, even a live-action character would pick up the weapon.

BREAKING UP IS HARD TO DO

To make matters more complicated, both the ships and the battle droid models had to be constructed in such a way that

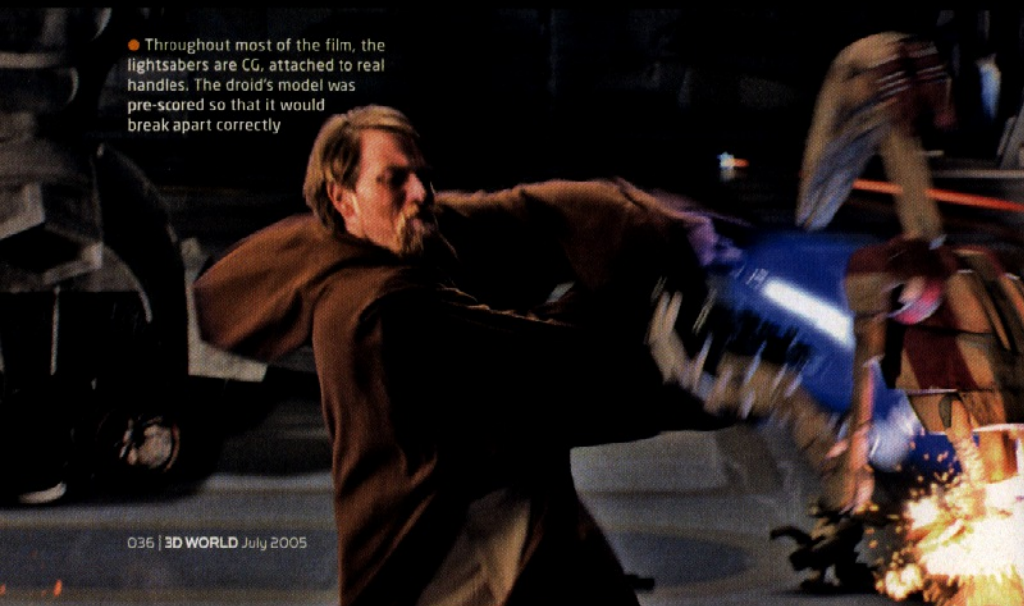
they could be broken apart during the combat scenes - a process that couldn't be easily achieved solely by procedural techniques.

"We're working on a long-term project to automatically generate scoring using a mechanism based on forces, but that's complicated, especially with twisted metal," says Tooley. "It's a major task figuring out how all the things are supposed to crack and crumble automatically. So we prescore the models."

Each droid model that would "go dynamic," as Tooley puts it, was prescored in seven or eight different ways so it would break apart predictably in combat. The battle droids were animated using motion-capture cycles until they were chopped and sliced, then rigid body simulations sent the pieces crashing to the floor.

Characters wearing clothes, however, created new problems. Slicing CG cloth and having it react properly during a rigid body simulation was a particular challenge during shots in which General Grievous's guard is decapitated. "There was the question of whether we'd only have rigid characters with no clothing and clothed creatures that didn't get chopped or become rigid," says Creature Simulation Supervisor Juan Luis Sanchez. "Running rigid body simulations on animation in isolation is not groundbreaking, but putting cloth simulations together with rigid body simulations was a challenge. We had to chop the clothing at an exact spot and make sure the pieces would fly."

The solution, for the most part, was to split the shot into two parts - one pre-chop, the other post-chop. "Mostly, [we] would animate the creature to the point where it lost its head," says Sanchez. "We'd chop the head off and do a rigid body



● Throughout most of the film, the lightsabers are CG, attached to real handles. The droid's model was pre-scored so that it would break apart correctly

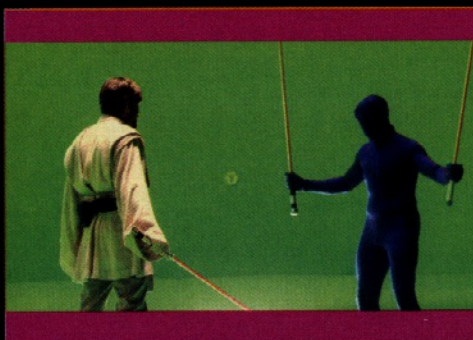


● Digital matte painters created establishing shots for the scenery of all the planets in the film, using 3D geometry and projected texture maps

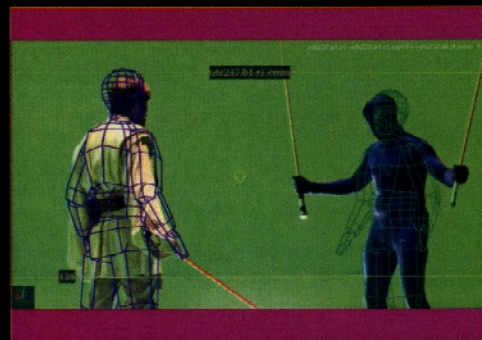
IN FOCUS | Obi one, Grievous nil: the anatomy of ILM's greenscreen fight sequences



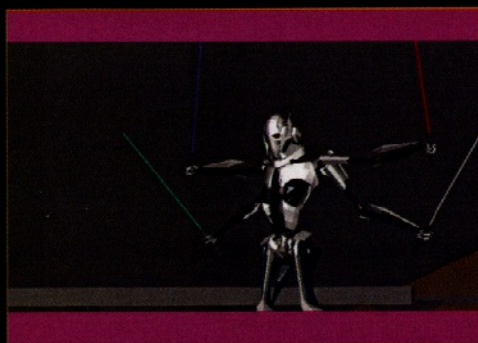
General Grievous isn't just a cool-looking model: he's a four-armed, bounty-hunting Jedi killing machine. For the character's crucial battle sequence with Obi-Wan Kenobi, ILM combined greenscreen footage, multiple render passes, and a little compositing wizardry to integrate Grievous convincingly with the live actors and the digital background.



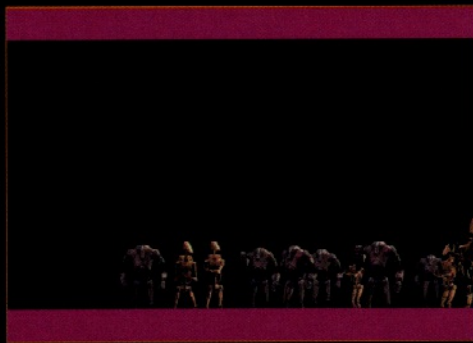
01 Ewan McGregor was filmed fighting a man in a blue suit on a greenscreen stage. During principal photography, the blue-suited man gave McGregor someone to perform with and provided reference material for the team. But reference footage could only go so far: the General's second pair of lightsabers - and the arms that wielded them - were entirely down to the animators' skill.



02 Matchmoving determined the position of the characters relative to the camera. 3D meshes that moved with the filmed actors helped the animators block out the moves that General Grievous would make during his fight with Obi-Wan, before the low-resolution model was dropped into place in order to refine the basic movements.



03 For speed and ease of animation, the animators worked with low-resolution versions of the models - something particularly important with a character as complex as Grievous, whose model contains 4,591 NURBS surfaces. Intricate rigs provided control of the evil creature's 200 joints.



04 Because the fight takes place in a digital environment that was particularly render intensive the background droids were animated and rendered as separate elements. As before, droid performances were based on mo-cap cycles up to the point where they were cut up; after that, a dynamic simulation was used on their parts.



05 Although in most other shots the lightsabers are CG elements, for this final shot, it was down to compositor Eddie Pasquarello made them glow. The use of Sony SRW-1 and SRW-5000 model VTRs that store HD images in an 4:4:4 RGB format, which supports 10-bit colour, made greenscreen extractions more precise.

simulation on that, and the cloth around the head would tumble with the head. The other piece of cloth would stay with the body. We'd have a single polymesh in the first part of the shot, and then two meshes, one for each piece, in the second."

CLOTH CAPERS

ILM's cloth simulation engine works by moving the cloth polymesh when it collides with the volumes that make up a character. Most of those were rigid; some were scaled with muscles: "We made the volumes soft or hard depending on the situation," says Sanchez. "With extremely fast motions, we made the volumes impenetrable."

Changes to the cloth simulation methodology helped speed up the process - an individual sleeve could be re-simulated without needing to recalculate the rest of the garment's motion. Although ILM describes it as "not leaps-and-bounds different" to the version used in previous movies, the solver was also tweaked, making it easier for the TDs to perform simulations. ▶



IN FOCUS | Building the Boga: how ILM solved its heaviest technical challenge of the movie

Episode III's largest new creature is the Boga, a giant lizard that Obi-Wan rides.

But the main technical challenge posed by the creature wasn't its size. Unlike terrestrial reptiles, the Boga has feathers - a ruff around its neck, and feathers on its tail.

An arsenal of procedural techniques were employed for the animation: flesh simulation to sell the impact of the Boga's feet hitting the ground; a simulation to slide the skin over its rippling muscles; and feathers that would react to the moving flesh, but could be controlled by animators.

Because it took 4GB of RAM to load the lizard into shots, the simulations were run in layers: "We'd run the flesh, skin and feathers as separate passes because it was easier on CPUs and memory," says Creature Supervisor Erin Ferguson. "It was painful, but the sims ran quickly." A new flesh simulation engine called 'phys-bam-flesh', written by Ryan Kautzman, pumped out



● Animators could move the Boga's feathers up and down to create emotional reactions. A dynamic pass on top followed the action, introducing fluttering on the edges

rippling muscles in 6-14 seconds per frame, using volumetric areas inside the model to represent bone mass.

On top of the flesh, another simulation moved the skin, allowing it to slip over and against the muscles: "The skin has a new feature that lets you loosen it up," says Ferguson. "You could set a parameter that determined

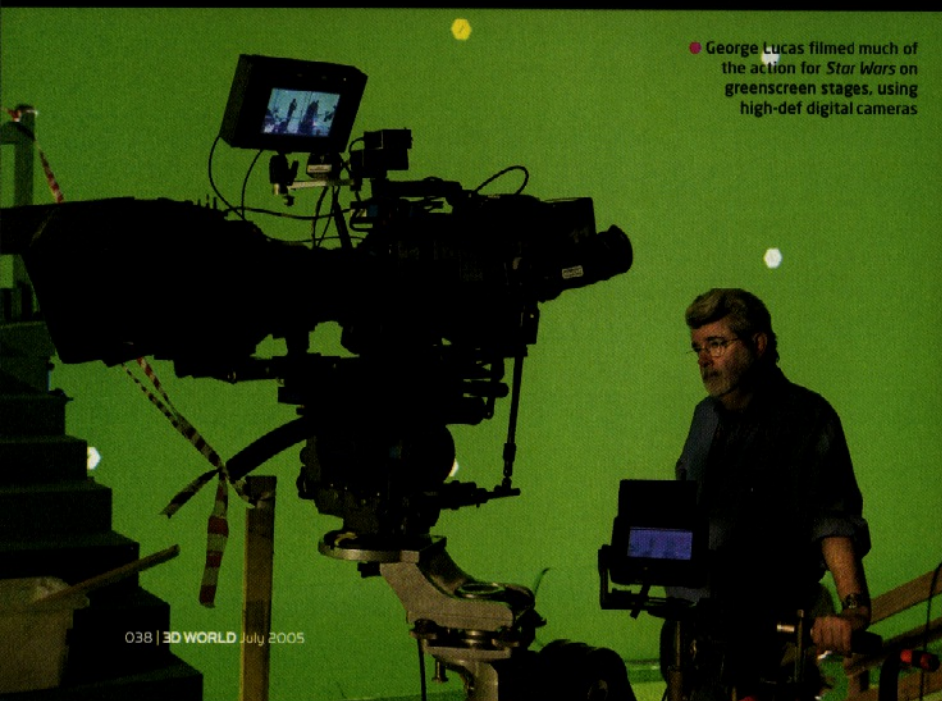
how loose the skin would be on the surface, which created some folds."

The skin then drove the surface onto which the feathers were attached. "It was challenging because the core [of the feather] had to be a rigid piece surrounded by something loose," says Juan Luis Sanchez. "Sometimes we'd push the softness to sell the feathers;

other times we stiffened the core." Of course, this being *Star Wars*, a single four-ton feathered lizard could seem like an understatement. To create some company for the beast, the team mixed and matched slight variations in body shapes and texture paintings. The result was not one, but several - and all without a feather out of place.

"In Episode II, the question was whether we could have digital doubles of the actors for the stunts. This time there was no question."

JUAN LUIS SANCHEZ, CREATURE SIMULATION SUPERVISOR



● George Lucas filmed much of the action for *Star Wars* on greenscreen stages, using high-def digital cameras

Because the simulation engine had been well used prior to *Episode III*, ILM was able to use the technology in artistic, rather than merely functional, ways. "Cloth could be part of the creative process, not just a technical bottleneck," says Sanchez. "It wasn't just a case of making it sit on the character."

This was especially true for Yoda [see boxout: 'From puppet to pixels: Yoda's journey to the digital side']. "In *Episode II*, we got a nice look [to Yoda's cloak]," says Sanchez. "It looked real. It didn't get caught around his ears. So, in this movie I was interested in what more we could do with it."

Other old familiar faces from *Star Wars*' past posed a rather different technical challenge. In *Episode III*, we get to see the Wookies on their own planet, Kashyyyk. More than one Wookiee meant more than one character with long fur, and since they were



● The actor in this scene was filmed on a greenscreen stage. Everything else - droids, ships, backgrounds - was created at Industrial Light & Magic



● One of the many digital environments created at ILM for *Episode III*. This scene uses simulated holograms to help the Jedi conduct an intergalactic conference

a mixture of digital creations and costumed actors, the digital fur had to match that seen in live plates.

"We found we were able to leverage the technology we developed for *Van Helsing*," says Ferguson, "but in this film, there were so many of them. Hundreds upon hundreds running around: we couldn't take the same amount of time per shot as we did with *Van Helsing's* werewolves."

By repurposing hair simulations, the sims remained usable even when the animation changed from one of the ten different motion-capture cycles to another: "We ran hair simulations on all the Wookiee cycles," says Ferguson. "They were calculated in skin deformation and saved in local skin deformation space, so if the skin deformation changed, the hair would change with it. The animators could take those cycles and blend them together and we wouldn't have to re-run the hair simulation."

To animate the Wookiees' bandoliers, the team used the cloth engine. The technology also found itself pressed into service for a surprising range of other tasks, ranging from the plants on one planet, to the feathers on the Boga - a giant lizard Obi-Wan rides - to General Grievous' guts [see boxout: 'Grievous bodily charm: the creation of the Jedi-hunter'].

Cloth simulation also played a major part in making the digital doubles convincing. "In *Episode II*, the question was whether we could have digital doubles of the actors for the stunts," says Sanchez. "This time, there was no question. In *Episode II*, we split a performance halfway through a shot once or twice. In this film, we did that a lot more."

"Halfway through a shot, an actor might be walking or flying, and go from CG to live action and back," he adds. "Sometimes we'd preserve the live action head and create a digital body. We knew it would hold up; we were much more confident this time around."

SUCH SWEET SORROW

Despite its obvious pride in its work, after 30 months, 375,040 frames and nearly 13 million individual renders and composites, you could forgive ILM for being glad just to get the job out of the door. But now the saga has come to an end, the effects team have mixed feelings. With the *Star Wars* franchise spread over three decades, many who worked on *Episode III* saw *Episode IV* as children. So for many, saying goodbye to the saga means saying goodbye to a part of their childhood.



● The city-world of Coruscant was created entirely in ILM's digital matte painting department with 3D tools, rendering software, and Photoshop

"Halfway through a shot, an actor might go from CG to live action and back. We knew the results would hold up; we were much more confident this time around."

JUAN LUIS SANCHEZ, CREATURE SIMULATION SUPERVISOR

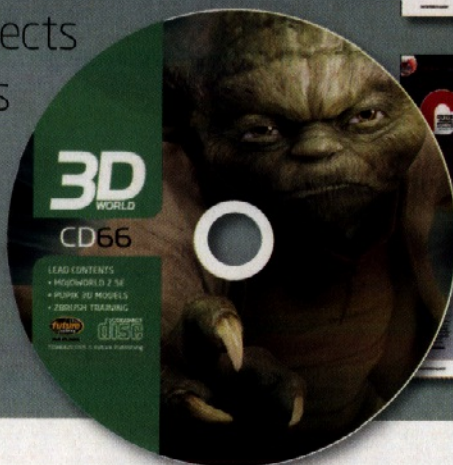
"With a movie like *Star Wars*, people come onto the crew with fond childhood memories and a real excitement about the film," says Ferguson. "We don't have to build a culture - they're passionate and interested in doing it right. We had an amazing team that was great to work with. And for that reason, it'll be sad to see it go."

A sentiment that will no doubt be shared by millions of fans across the globe - many of whom are active within the CG community. With the Clone Wars at an end, Anakin Skywalker returned to the dark side, and the loose ends of the plot tied up, there remains only one question: with no more new *Star Wars* movies to look forward to, what will 3D artists find to talk about at the pub?

Star Wars: Episode III - Revenge of the Sith opens in both the US and the UK on 19 May, and will be screened worldwide the following day. For more information, see the official website: www.starwars.com

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TUTORIALS

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SOFTIMAGE|XSI

all in the eyes

Tired of seeing CG characters with cold, dead eyes? Master this robust, production-proven facial rigging system, and you'll soon be animating the winks, blinks and glances that really bring a 3D model to life

BY ROB CAZIN

FACTFILE

FOR

Softimage|XSI

DIFFICULTY

Advanced

TIME TAKEN

Two hours

ON THE CD

- Full-size screenshots
- Start and finish scene files
- Demo animation
- Pre-built expressions

ALSO REQUIRED

N/A

There are many who argue that the art of 3D character animation is now entering its golden age. The ever-increasing quality of animated movies such as *Shrek* and *The Incredibles* has created an escalating demand not only for stunning visual effects, but for engaging stories. And, for the story to work, audiences of all ages need to see 3D characters that they can relate to and believe in.

Of all the body's points of communication, the face is the most important, and also the most subtle. Because of this, its features are the most difficult parts of a character to animate convincingly – and none more so than the eyes. Creating realistic eye movement is an essential element of getting the face right, but eye and eyelid animation presents animators with an extremely complex challenge: melding voluntary (point of focus), involuntary (expression) and automatic (blinking) movement.

Until recently, hardware and software limitations have prohibited the widespread application of complex facial rigs that could simplify the approach animators took to marrying these motions. Now, however, high-end 3D software packages such as *Softimage|XSI* are designed to provide a toolkit for the creation of complex custom

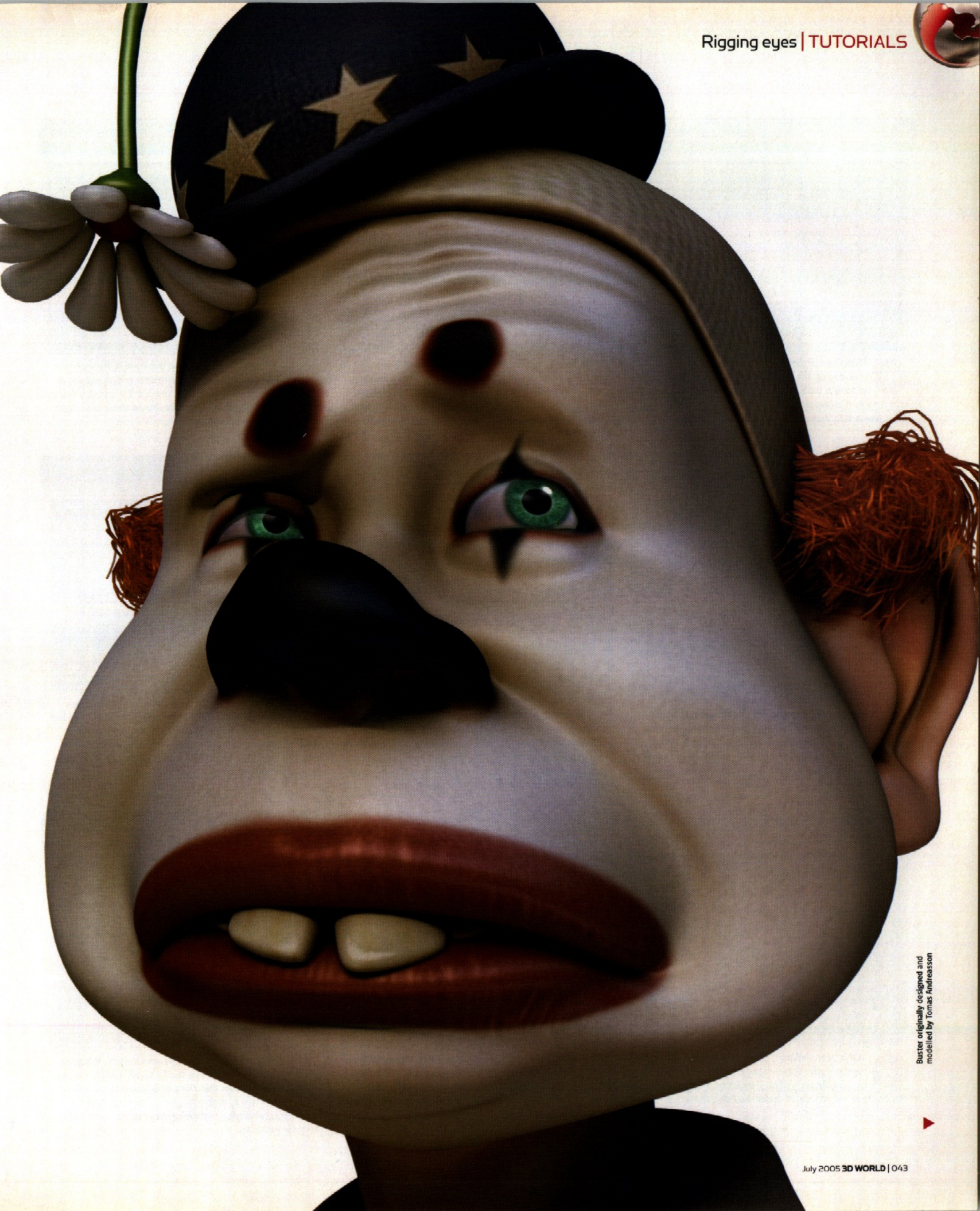
rigs. With careful planning, rigs can be designed that provide animators with an intuitive workflow, and help them to achieve consistently successful results.

MEET BUSTER

At Sol Animation, we've developed a simple yet very powerful eyelid control system that intuitively balances manual and automatic deformation. The rig, as it's presented in this tutorial, is currently being used in the production of an original HD short featuring Buster, the character shown on the right. A simplified version of the model is featured on the CD. Earlier versions of the rig were developed for our award-winning History Channel animated shorts, and stills from these shorts are also included on the disc.

Once you've mastered this technique you'll be able to apply it to any character or creature to create natural eye movement that will really help to bring your creations to life.

Rob Cazin is President and founder of Sol Animation. Since 1991 his company has produced award-winning character animation for the advertising and entertainment industries [w] www.so-animation.com

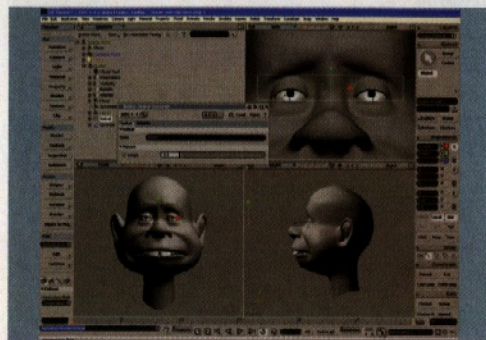


Buster originally designed and
modelled by Tomas Andreasson





STAGE ONE | Create a constraint system



01 Begin by opening the scene eye-rig-start.scn included on the CD. Create a primitive implicit square of length 0.05. Translate it to 0, 0.37, 1.6, and scale it in the Front viewport to roughly span the areas of Buster's eyes. Name this 'lookat' and parent it under Buster.



02 Create a primitive null and parent it to lookat, translating it to 0,0,0 locally. Scale it uniformly to fit within lookat. Translate it to the right, roughly centred on the left eye, using the Front view. The position doesn't have to be perfect, as we'll be using constraint compensation later on.



03 Rename the null 'left' and duplicate it. Rename the duplicate 'left_upv' and translate in Y to just above lookat. Select both nulls and duplicate, translating in X to the opposite side of the square. Name these nulls 'right' and 'right_upv' respectively.

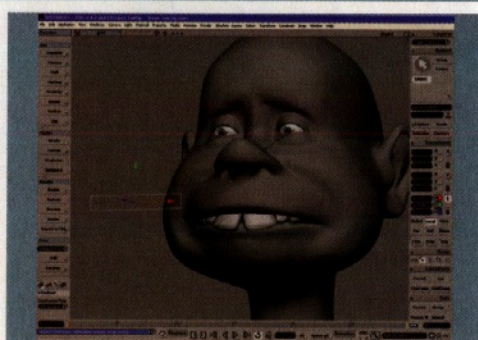
STAGE TWO | Constraining the eyes and setting a neutral pose



04 Highlight the CnsComp button. Expand the HEAD node located under Buster, select the eyevector_left null. Apply a directional constraint (Constrain > Direction). Pick the 'left' null. Click the Up Vector tab in the Properties window and click on Pick New, choosing the left_upv null. Repeat these steps for the right eye vector using the right nulls.

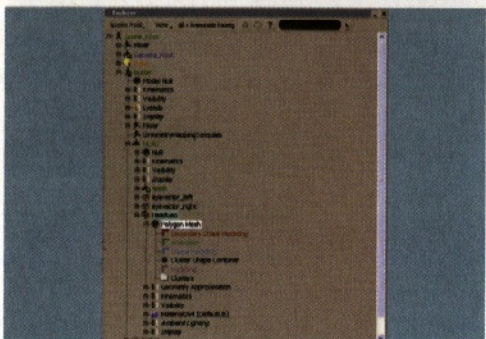


05 Un-highlight the CnsComp button. To establish a neutral pose for the lookat hierarchy, select the lookat object and set a neutral pose (Transform > Set Neutral Pose). Hit the Selection button and click the Local Transform icon. Click on the Pos. Limit tab and check Z Active for minimum and maximum, setting both to 0; this permits movement on X and Y only - the only axes we need.

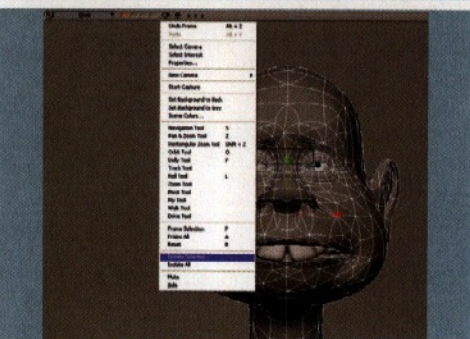


06 Now that our lookat target is zeroed out, let's see how the constraints behave. Move the lookat around and Buster's eyes should follow. This particular setup is optimised to have a range of -1 to +1 on both axes. If everything is working, set its translation back to zero and proceed to the next step.

STAGE THREE | Creating the upper eyelid clusters



07 In the User viewport, frame all (hit [A]) to see all the objects in the scene. In the Explorer viewport, expand Buster > HEAD > HeadGeo > Polygon Mesh. The clusters will be located under the Polygon Mesh property.



08 Select the Head geometry by picking it interactively in the User viewport. Click on the User viewport's Camera icon and choose Isolate Selection. This is a nice way to interact with a model without obstruction by the other elements in the scene.



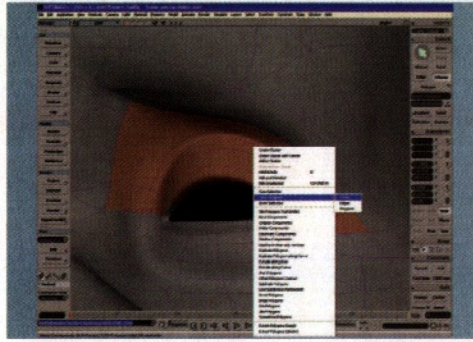
09 Select the polygons for the upper eyelid, using the image as a guide. You should select a wide enough range to allow stretching of adjacent areas. You should experiment with this range in future applications, since you'll probably be combining these shapes with other facial deformations.



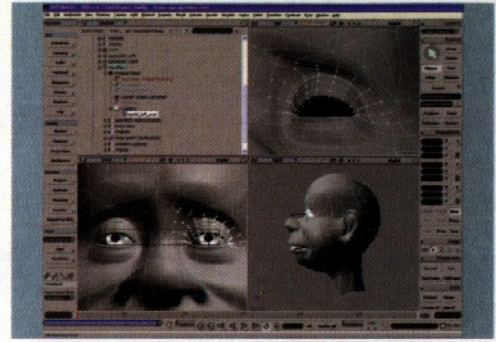
STAGE THREE (Continued) | Creating the upper eyelid clusters



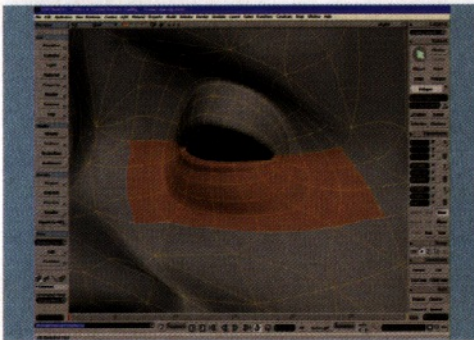
10 Be sure to include the polygons that wrap to the inside of the lid. One way of doing this is to select ([U]) and frame ([F]) a group of polygons to orbit and navigate within the area of the interior. You could also select ([Y]) the polygons from the front view with the viewport display mode set to Wireframe. Then remove the polygons that were selected on the back of the head.



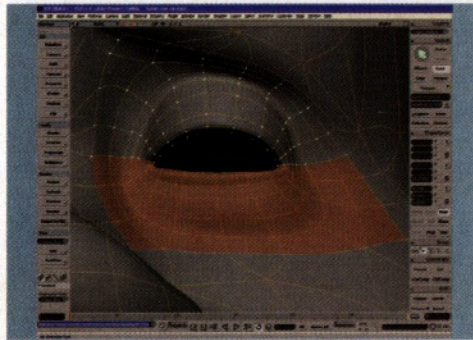
11 Once you've selected exactly the polygons you want to include in your cluster, [ALT]+right click over the selected polygons to bring up the contextual menu and choose Select Adjacent Points. This is a quick way of selecting points without tagging, and also makes selecting a uniform area much easier.



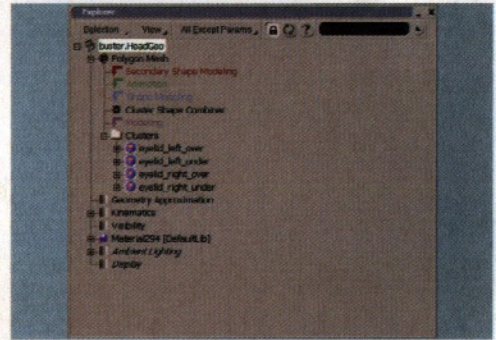
12 With the points now highlighted, hit the Cluster button at the bottom of the Main Command Area. In your Explorer viewport, expand Buster > HEAD and select HeadGeo. Under the Polygon Mesh node, open the Clusters folder. Rename the cluster 'eyelid_left_over'.



13 As with the upper eyelid, select the polygons for the lower eyelid, referring to the image as a guide. To allow for stretching of the adjacent area, include the area just beyond what you would normally define as the lower lid and do the same with the upper lid, bearing in mind the intended range of influence.

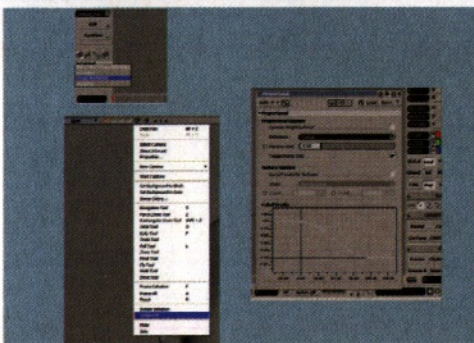


14 Be sure that the upper border of your selection aligns exactly with the lower border of the upper lid cluster; toggle between the view of your upper cluster and your selection to compare. Don't forget to include the polygons that wrap to the inside of the lid.



15 Store this cluster as eyelid_left_under. Repeat steps 7 to 15 to create the right eyelid upper and lower clusters. Click on the cluster button with Buster's head selected; your cluster list should look like the one here.

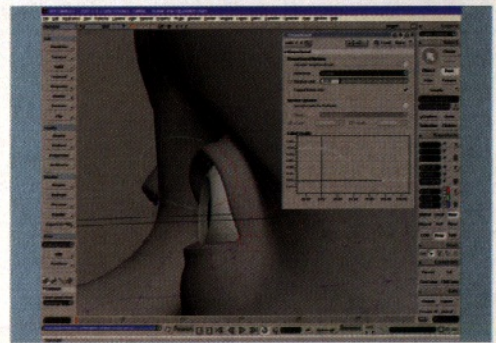
STAGE FOUR | Modelling the shapes



16 This stage requires some modelling skills, but we're focusing on rigging, so your shapes don't have to be perfect. Before starting, set the Construction mode to Shape Modeling. Unhide the eyes in the User viewport (Isolate All) and activate Proportional editing by clicking the Prop button. Right click the Prop button to open its properties. Set the distance limit to 0.05 and check Tagged Points Only.

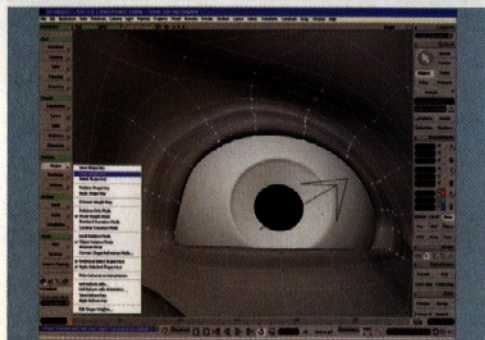


17 Select the eyelid_left_over cluster by selecting the head in the User viewport and clicking the Clusters button. In the pop-up menu, select eyelid_left_over. The points in the cluster will highlight white. [ALT]+right click over the highlighted cluster and choose Select Members/Components.

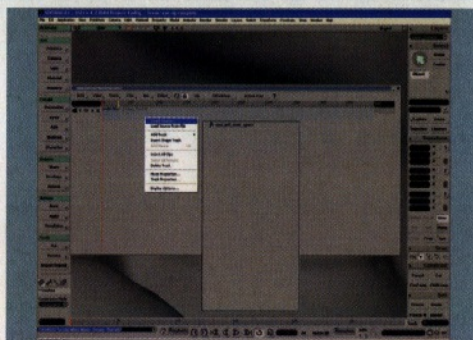


18 With the points selected, hold down the [M] key and reshape the lid to make an open shape by moving points around the inner edge. Refine the shape by orbiting around the eyelid area, and lower the proportional limit as you progress.

STAGE FOUR (Continued) | Modelling the shapes



19 Once you're satisfied with your eyelid shape, click the Clusters button again and select the eyelid_left_over cluster. In the Animate toolbar select (Deform > Shape > Store Shape Key). Name the shape eyelid_right_over_open.

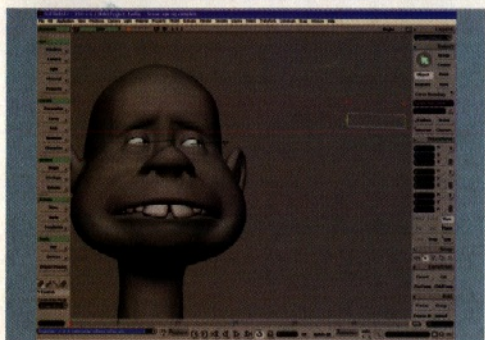


20 Open the Animation mixer for the head by typing [Alt]+[O] with HeadGeo selected. Add a Shape track ([Shift]+[S]). Right click anywhere on the Shape track to bring up the Contextual menu. Select Insert Source, and pick your newly created shape.



21 With the clip selected, right click and select Clip Properties. In the Time Control > General tab, set the Source Clipping In to 0 and Out to 500. Set the Time Reference Start Offset to 0. Set the Weight slider to 0 to return the lid to its original shape. Repeat steps 16-21 for the lower eyelid, and the right upper and lower eyelids.

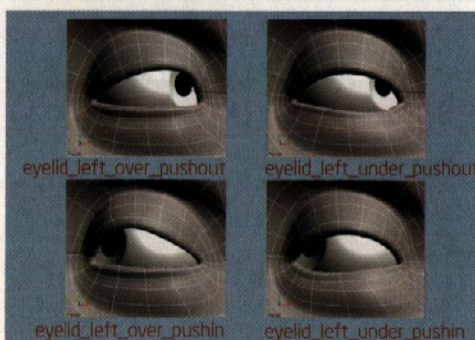
STAGE FIVE | Modelling the side-to-side shapes



22 When the human eye looks to the extreme left or right, the eyelid naturally deforms. We'll need to create these shapes as well, in the same way as we did in Stage Four, to achieve a realistic deformation with our rig. Begin by translating the lookat object to -1 in X, so Buster looks to his extreme left.

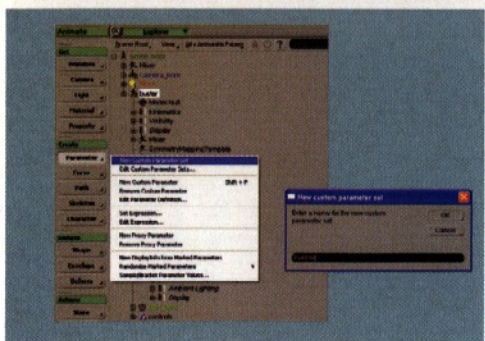


23 Refer to the image above to make your push-out shapes for the left upper and lower lids. They should lift and pull in the direction the eye is looking, so as to suggest the elliptical structure of the eyeball. Store the shapes and add them to the mixer, naming them as follows: 'eyelid_left_over_pushout' and 'eyelid_left_under_pushout'.

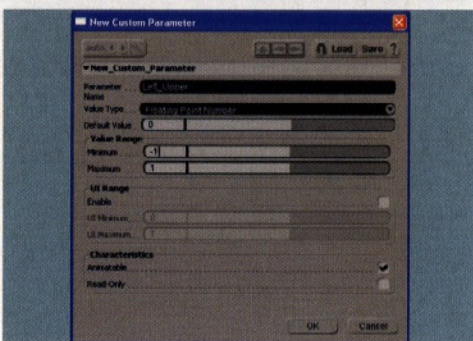


24 Change the lookat position to +1 in X, so Buster looks to his extreme right. Repeat the previous steps to create your push-in shapes for the left upper and lower lids. Store the shapes and add them to the mixer, naming them as follows: 'eyelid_left_over_pushin' and 'eyelid_left_under_pushin'.

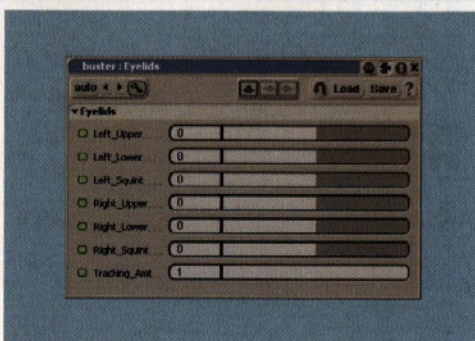
STAGE SIX | Creating the slider panel



25 There are many ways to interact with the controls in a character rig. We prefer to use sliders because they offer a fine level of control and conveniently group the controls inside a movable window. Select the Buster node, and in the Animate toolbar select Create > Parameter > New Custom Parameter Set. Name it Eyelids.



26 Open an Explorer window and select the Eyelids Parameter Set. Type [Shift]+[P] to add a new parameter to the set. Name this parameter Left_Upper, and set the Value Range Minimum to -1 and the Maximum to 1.

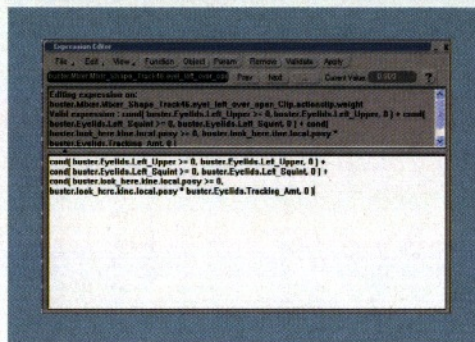


27 Create parameters for Left_Lower, Left_Squint, Right_Upper, Right_Lower and Right_Squint with the same Value Range settings. Create a final parameter called Tracking_Amt. Set its Value Range Minimum to 0 and the Maximum to 1. Click on the orange Eyelids Property icon to inspect the custom parameter set.

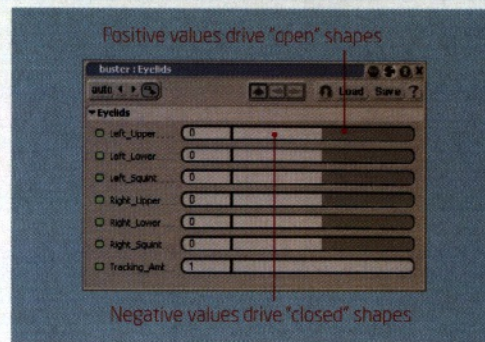
STAGE SEVEN | Wiring the system



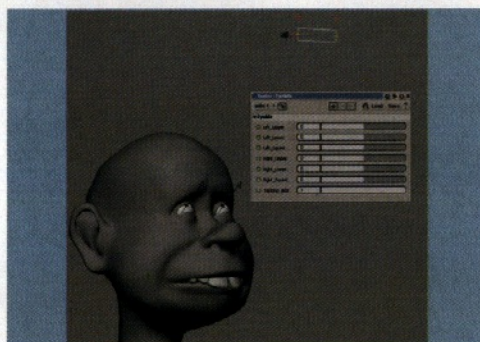
28 We'll now establish the connection between the lookat system, the Eyelids Custom Parameter Set and the eyelid shapes. We'll use expressions to combine the Inputs. Open the Animation mixer for HeadGeo. Your track layout should match the above image. Right click the green Animation icon to the right of the eyelid_left_over_open clip. Select Expression Editor from the pop-up menu.



29 You'll see an empty white text field in the editor; this is where we'll write the expression to drive the weight of the eyelid_left_over_open clip. Copy the first expression from the Expressions.doc file found on the CD. Validate, Apply and close. Repeat these steps for each shape clip in the animation mixer using the pre-built expressions supplied in the same document.



30 Our slider panel has controls that generate negative as well as positive values; this is a convenient way of controlling two shapes with one slider. We want the left upper lid to open only when the Left_Upper slider is greater than 0, so we'll use the condition function to achieve this. If it isn't above 0, the expression returns a value of 0.



31 To determine the amount of automatic tracking for the Upper Open shape, we need to check the Y position of the lookat object. Only if the Y position is above 0 do we contribute its influence. This way, the open shape will only become active when the eye is looking up. The Tracking_Amt slider controls the amount of automatic influence, giving the animator more flexibility.



32 Finish by typing in the remaining expressions for each of the clips. After completing all the expressions for the twelve shape clips, our rig is complete. Close the Animation mixer, and frame all in the User Viewport. Select the lookat nulls and create a group ([Ctrl]+[G]). Name it 'hidden_controls' and hide the group ([H]).



33 Open the Eyelids Custom Parameter Set. Click on the Lock icon to keep it active. Set the Tracking_Amt slider to 0. Select and move Buster's lookat in a circular motion. His eyes follow, but there's no automatic eyelid deformation. Set the Tracking_Amt slider to 1. Now his automatic tracking is fully active, and will respond to the movement. Take some time to experiment with different

combinations of slider settings. The combination of these controls allows a broad range of expressions, from realistic to cartoony. You may notice that it's possible to overshoot and create some undesirable shapes but, with the great degree of expression and flexibility offered by this system, you'll find that with a little practice you'll be able to create convincing, naturalistic eyelid animation every time. ●



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First up is *Introducing Maya 6: 3D for Beginners*, by Dariush Derakhshani. Written with the novice in mind, this easy-to-follow guide offers a practical and fun way to discover the key features of 3D modelling in general, and of *Maya* in particular. It includes sections on navigating the software's interface, mastering the tools, the basics of NURBS, polygons and subdivision surfaces and using *Maya* with *Photoshop*. In addition, there's a bundled CD packed with working files and examples, along with a copy of *Maya PLE*.

The second book on offer is the second in the award-winning *Maya Secrets of the Pros* series. The pros in question are Derakhshani and John Kundert-Gibbs, veterans of movies such as *The Matrix*, *Shrek 2* and *X-Men*, and they provide detailed instructions on every aspect of *Maya*, from enhancing fluidity and realism with *Maya* cloth to using *Maya*'s noise function to produce movie-quality effects. Again, the CD features all the animations,

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- A. *Shrek 2*
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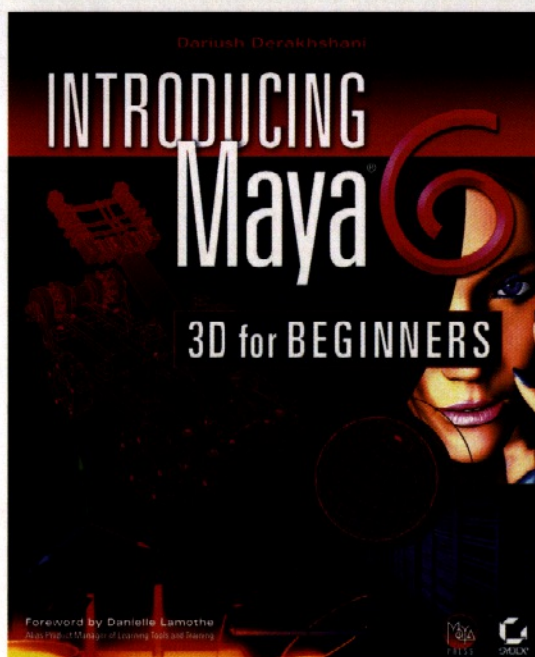
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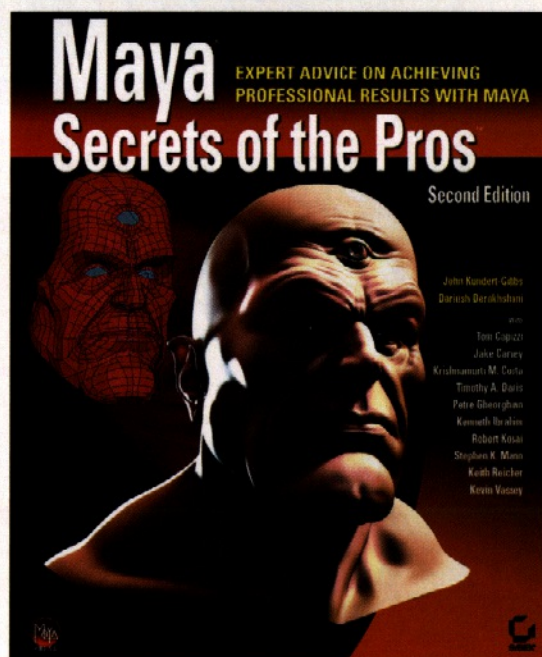
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ON THE CD

• *Mojoworld 2 SE*
(worth \$149), plus
full tutorial files
SEE PAGE 115

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Mojoworld 2 SE

DIFFICULTY

Elementary

TIME TAKEN

1-2 hours

ON THE CD

- Full-size screenshots (annotated to show important features)
- Reference scene files relating to steps 09, 12, 15 and 21
- Final scene file

ALSO REQUIRED

N/A



Mojoworld is more than just a landscape creator.

Where other landscape-creation packages allow you to merely build a stage set, *Mojoworld* gives you planets the size of Earth. You can, therefore, point your camera in almost any direction without ever seeing hollow edges of terrain pieces. This full planet paradigm does require a bit of a change in your thinking: rather than building a specific scene, you've got a whole new world to explore.

Mojoworld 2 SE (included on this issue's CD) enables you to create new planets, and significantly modify existing ones. It differs from *Mojoworld Generator 2* – the version of the software that most previous users will be familiar with – in several ways, most notably that it doesn't allow access to the Pro UI (the Function Graph Editor). However, unlike *Generator 2*, it does include the new JogNav Navigation tool. And while the Planet Wizard isn't available in *2 SE*, and nor does *2 SE* import standard 3D model formats, it does include the *Mojoworld 2 Transporter* interface in its entirety.

When the application is launched, an introductory screen will give you the option of viewing a startup tutorial. This is a set of

HTML files viewed in a web browser. You should review these files to master the basics of navigating a *Mojoworld* planet, and for an introduction to the pieces of the Generator interface.

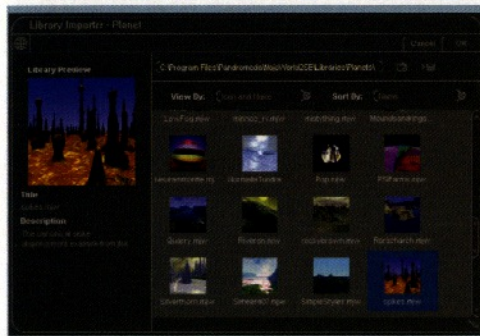
Once you've done so, you're ready to begin this tutorial, which covers the process of opening and modifying an existing planet, including creating the crescent moon effect seen above.

After you've explored *Mojoworld 2 SE*, you may want to upgrade to the latest version of the software. In *Mojoworld 3*, the tools for manipulating primitives and imported models have been dramatically improved. Version 3 also adds several new object types, including pre-textured plant models, a PhotoBillboard object, a Boulder tool, and a gel spotlight – for a complete tour, visit the Pandromeda website at www.pandromeda.com. *3D World* readers can buy *Mojoworld 3* at a 20 per cent discount: see page 54 for details.

Calyxa Omphalos has been rendering computer-generated landscapes for a decade. She follows the True Path of Mojo and has a sadly outdated website... [w] <http://calyxa.pandromeda.com>



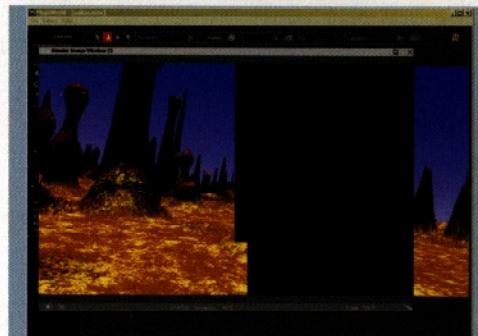
STAGE ONE | Setting up custom rendering and textures



01 Click File > Open using the Browser to view the Planet library dialogue. With the scroll widget on the right, scroll down to the planet named 'spikes.mjw'. Double click the planet's icon to load it. If the library browser doesn't show the Planet library, click on the House icon in the upper right corner.



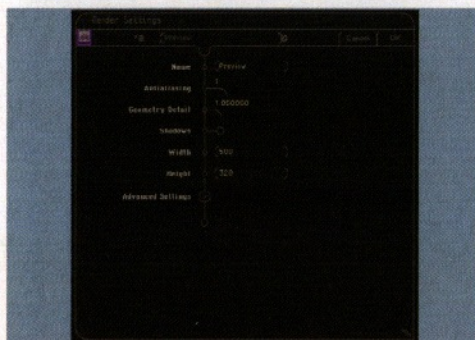
02 To get a feeling for the application, it's a good idea to explore the world, and find an interesting view. Use the JogNav flat arrows to move your camera forward, backward, left or right. Use the Trackball to look around while remaining in place. Drag on the arc above the Trackball to change the camera's Field of View.



03 Click the 'Render Now' Camera icon to render a Medium Quality version of the scene so far. The resulting render will be the same size as the Real-Time Render preview window (referred to as RTR for the remainder of this tutorial). The length of time this will take depends on the speed of your computer and the position and view of the camera.



04 We'll now define a custom render setting for quick preview renders. To the right of the Render Now Camera icon is the Render Settings Menu icon. Click this to open the Render Settings menu. Now choose the Settings item to open the dialogue box for defining a custom render setting.



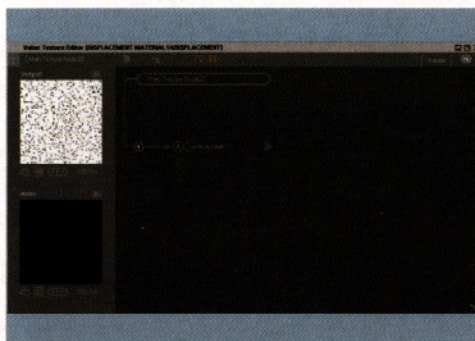
05 In the Settings Editor dialogue box, click the Menu icon in the upper left and select 'Add New Setting...' to create an editable render setting. The default name for the new setting will be 'New Setting'. Refer to the screenshot above (a full-size version can be found on the CD) to see which parameters to use.



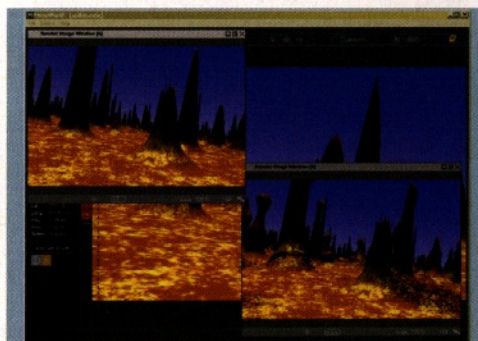
06 Select your setting on the Render Settings menu. If the custom setting has a different aspect ratio from the RTR, a pair of dashed blue lines will indicate the edges of the area to be rendered. These will be across the top and bottom if the setting is wider than the RTR, or on the left and right if the setting is taller.



07 What makes *Mojoworld* unique is Overhanging Terrain. This is created through the land material's Displacement parameter. The displacements don't show up in the RTR, so it helps to temporarily disable them. Open the Land Material Editor and select the material used to show its parameters. Click the circle-T attached to the displacement parameter to open the displacement texture.



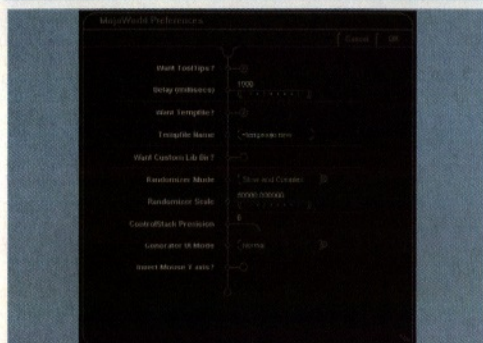
08 Each texture leaf is attached to the texture tree with a small circle. Clicking this circle disables the leaf. This particular texture has only one texture leaf. Temporarily disabling displacements can help determine if a render is hanging due to being inside a displacement or if the world in question is just very slow to render.



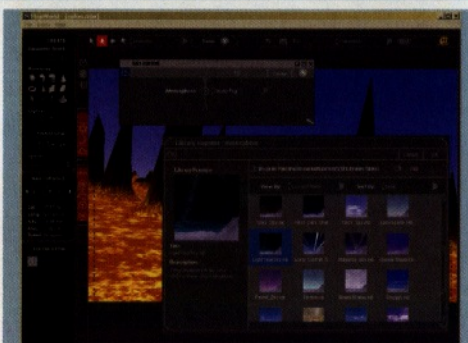
09 Do another test render preview without the displacements. The screenshot for this step shows two open Preview Render windows. The one in the lower right has displacements enabled and the one in the upper left has the displacements disabled. This world gets much of its character from the material displacements, so enable the texture leaf again before proceeding...



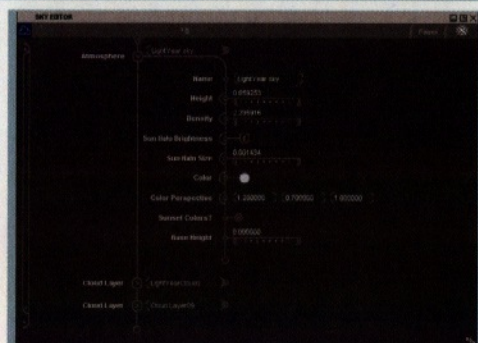
STAGE TWO | Creating the atmosphere and the crescent moon effect



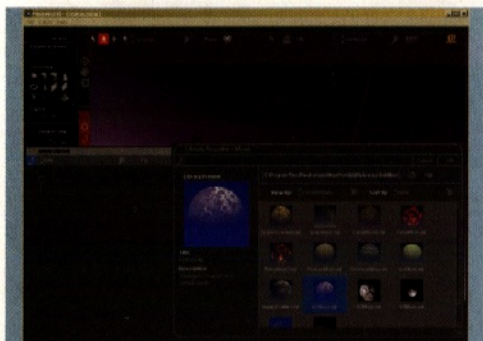
10 Some of the next few parameters we'll be changing are more advanced, and are hidden so as not to overwhelm the novice user. Under the Editors menu, choose Preferences to open the Preferences Editor. The preference we'll change in here is the Generator UI Mode. The default is 'Simple', so change it to 'Normal' and then click OK.



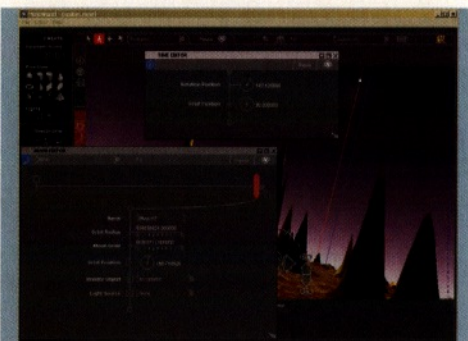
11 Now we'll load a new Atmosphere from the Skies library. Open the Sky Editor by clicking on the Sky Editor Global Parameters Hot button. Click the Menu icon and select Load From Library to open the Skies library. Use the scrollbar on the right to scroll down in the sky presets. Select LightYearSky.mjl and click OK.



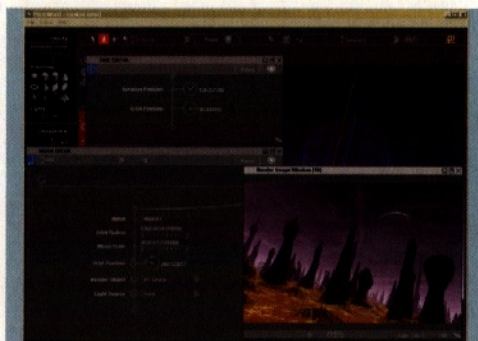
12 Expand the Atmosphere Control Stack and drag the lower right corner to view the Atmosphere parameters. The Color Perspective parameter has three fields specifying how much Red, Green and Blue light attenuates through the atmosphere. Values larger than 1.0 are significant, so the RGB values can't be represented by a simple Color dot. Again, refer to the screenshot for values.



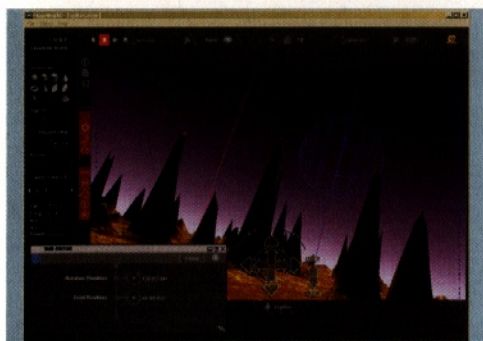
13 Now we'll load in a moon, but before doing so, make sure that the Sun Orbit red line is visible in your scene. Click the Moon Global Parameters Hot button to open the Moon Editor. Click the Menu icon and choose Load Moon From Library to open the Moon library Loader. Select K1Moon.mjl and click OK.



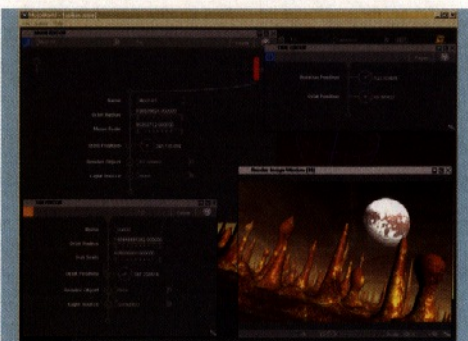
14 Click the clock dial to open the Time Editor. Drag the Rotation Position control until you see your Sun on its red orbit path appear at the top of the RTR. Always move this control immediately after importing a Moon, as this will cause the Moon to synchronise itself with Global Time and avoids a glitch where the Moon may unexpectedly jump on its orbit later.



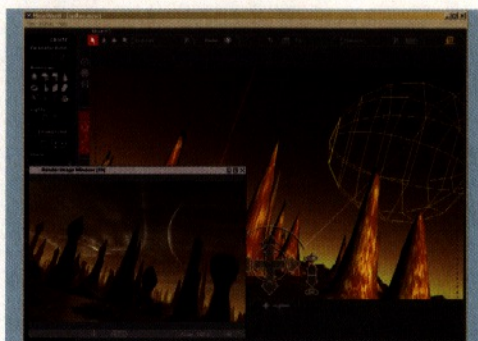
15 Use the Orbit Position dial in the Moon Editor to position the Moon on the horizon. Leave a sizable gap between the positions of the Sun and Moon. Next, use the Time Editor Rotation Position dial to rotate both the Moon and the Sun back up to where the Moon crescent should appear, ensuring that the Sun is placed where it will illuminate just the crescent.



16 The Time Editor also has a control called 'Orbit Position'. This dial controls the inclinations of the Sun's (and any Moons') orbits, simulating seasons. Note that if the Sun and Moon orbital planes coincide, one or the other orbit might not be visible without tweaking the Time Editor's Orbit Position control.



17 Just like in reality, the relative positions of the Sun and the Moon determine how much of the Moon is illuminated. Using the three different Orbit Position controls found in the Time, Moon and Sun Editors, it's possible to create all the phases of the Moon. With the Sun and Moon on opposite sides of the Planet, for example, the Moon is full.



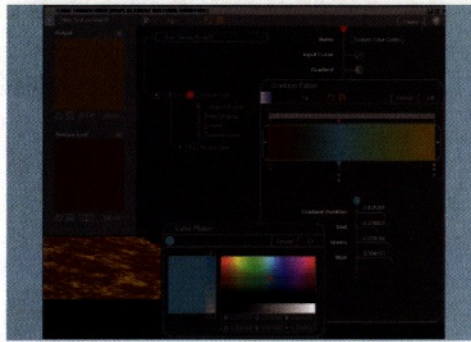
18 The Moon's orbital inclination may be affected with the Pick tool. The Pick tool must be active and the Global Parameters Hot buttons must be showing. The orbital inclination change may not be apparent until the Orbit Position is adjusted in the Time Editor. It won't work on the Sun until a Render object has been assigned to the Sun.



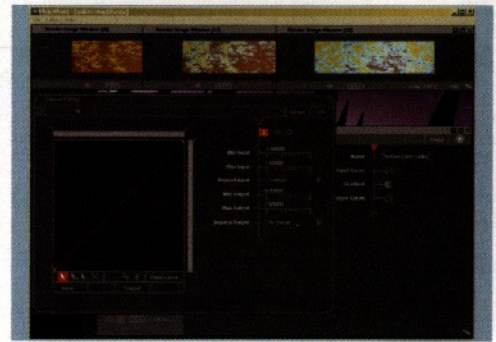
STAGE THREE | Colouring and texturing the planet's surface



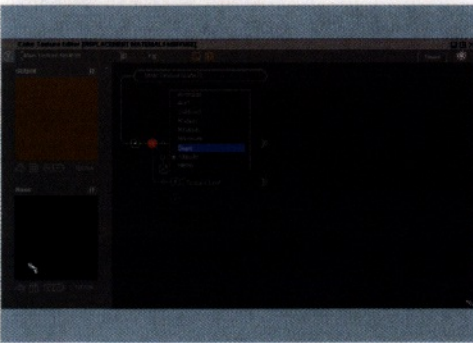
19 Now we'll change the colour of the surface. Click the bottom-most Global Parameters Hot button to open the Land Material Editor. Click the first material leaf to display its parameters. The Diffuse parameter is driven with a texture, so click the circle-T to open the Diffuse Texture Editor. In the Texture Editor, click the first circle-T to open its Kickstand, and then click on the Output Controls.



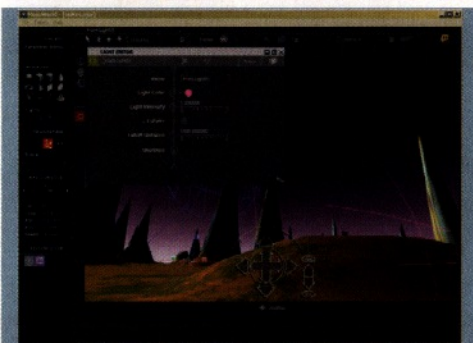
20 Click the Gradient icon to open the Gradient Editor. Click in the Gradient to add a new Color knot, or click below a knot to select it. Click the Color Dot to open the Color Picker. Drag on a selected Color knot to move it. Use the Delete key on the keyboard to delete the selected color knot.



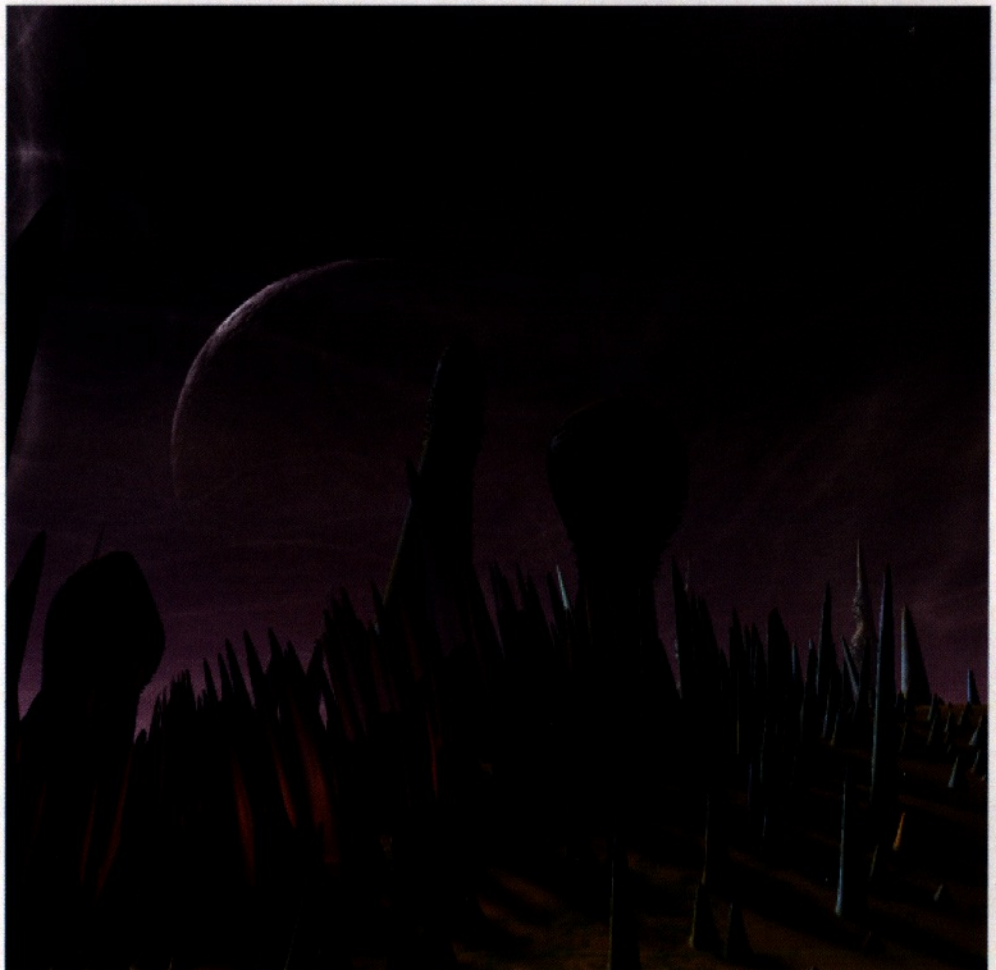
21 The Input Curve affects how the colours of the gradient are spread across the fractal, creating the texture. Refer to the screenshot for crop render samples showing the unmodified texture after adding the new colour to the gradient, and then after setting the Min Input parameter in the Input Curve to -1 (which allows the gradient to cover the full range of the fractal's output).



22 Now click the circle-B that connects the two texture leaves to change the Blend between them. It's currently set to Altitude, so change it to Slope. This will put the colour texture defined by the first texture leaf on the steep portions of the world. The colour texture defined by the second texture leaf will appear on the flat portions of the world.



23 Much of the foreground is too dark, so we'll add a Point light. Select the Point Light tool, and then click in the RTR to place it. The Translate tool will now become active. Drag on the blue control handle to move the light up off the Planet's surface. Click the Light Hot button to open the Light Editor. Check the Falloff box, or the light will illuminate the Moon...



24 Render out your final image. All the renders done so far have been without shadows, which are turned off in the Low, Medium and Normal render settings, but turned on in High and Maximum. When a custom render setting is defined (see step 5), a checkbox allows you to specify whether or not to render with shadows. While they add realism, shadows can greatly increase the time it takes

to render an image, so use them carefully. That's the end of this introductory tutorial, but we've only just scratched the surface of what's possible with *MojolWorld*. To go further, experiment with the software for yourself. For example, try changing the Basis Function used in the Displacement Texture (see steps 7-9), add an Ocean, or load a different Land Material from the library. The possibilities are endless! ●

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True blue

Even on low-budget shorts, bluescreen work is a vital part of the modern VFX artist's toolkit. Improve the quality of your bluescreen footage with these tips

Our experts this issue...



Bruce Steele

Bruce is a founder member of UK digital animation studio Glassworks, where he's Director of VFX and Head of Special Projects [w] www.glassworks.co.uk

Jordi Bares



Jordi has worked at Jim Henson's Creature Shop, Passion Pictures and The Mill. He was Emmy-nominated for his work on the BBC documentary *Pyramid* [w] www.mill.co.uk

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Chris is a writer and director who works with visual effects. He's currently directing a promo for a forthcoming TV series, as well as producing the effects. [w] <http://homepage.mac.com/thoughtfox>



From multi-million-dollar movies to student shorts, bluescreen work is now one of the most important tools in the visual effects artist's armoury. The technique allows a filmmaker to shoot foreground action against an evenly lit coloured background – usually blue or green – then replace these background areas with another image during compositing. While this second image can be a live-action plate, the technique is now commonly used to integrate actors and sets seamlessly into an all-CG environment. The technique was recently taken to its natural conclusion in movies such as

Sky Captain and the World of Tomorrow, in which all the action was shot against coloured screens, which were then replaced with digital backgrounds.

But while all that is actually required for the technique is a length of blue fabric and a desktop compositing package (for details, see our 'Bluescreen on a budget' tutorial from issue 60, or download it from our website, www.3dworldmag.com), to achieve truly polished results requires skill and experience.

So this month, we've asked three VFX artists to provide their tips for creating better blue and greenscreen effects. We'll start by answering one of the questions most commonly asked about this kind of work – what determines the choice of a blue or green screen in the first place, and can you use other coloured backgrounds? – before moving on to crucial considerations such as lighting setup, screen placement, and ways of avoiding pitfalls such as unwanted reflections and colour spill. On the way, we'll be revealing a number of tricks of the trade, such as using reflective foil on the floor of a set or employing a waveform monitor to check the evenness of the lighting on the screen. Finally, we'll look at those situations in which it's best to avoid bluescreen work entirely and rotoscope footage by hand.

Spanning the entire course of a shoot, from creating the set to processing the resulting footage, these production-proven techniques should prove applicable for a wide range of projects, and for an equally wide range of budgets – from independent shorts to professional ad, film and promo work.



● Modelled lighting casts a shadow across the actor's face, but he remains well separated from the blue background



FOR FLAMES, SMOKE AND WATER, YOU SHOULD ALWAYS SHOOT AGAINST A BLACK BACKGROUND

SHOOTING SKIN TONES

Both blue and green screens have advantages when it comes to shooting actors. Certain skin tones contain less blue, which reduces colour spill when using a blue screen, but the brightness of a green background sometimes means that this produces a better end result. If your actor is eventually going to be placed against a dark background, blue is usually the best choice. [BS]

TRY OTHER COLOURS

You don't even have to stick to blue or green screens for keying work – just try to choose whichever colour is furthest from your foreground colours. If you have to shoot green and blue balls bouncing through the frame, you might even choose a red screen! For flames, smoke and water, you should always shoot against black. [BS]

BLUE OR GREEN?

Why do we use both blue and green screens for visual effects work? Well, bluescreen was first invented as an optical process. Greenscreen came later, and it was used first for analogue TV and then for digital processing. While it's possible to use any colour as a key, there are pros and cons involved in your choice. The blue-sensitive layer of the film theoretically has the sharpest focus, but it also suffers from the coarsest grain. Greenscreen work needs a lot less light than blue but affects the midtones more in the foreground of the image. [BS]

EXTREME ENVIRONMENTS

Environments you can't control, like an underwater shot, may require a black screen. However, this can result in complex situations in which it is impractical, or impossible, to key the shot – either because the space is too big, the water has too many particles suspended in it, or simply because the actor has dark hair and won't cut. In situations like this, it would be worth doing a test with a consumer camera before arranging the shoot. The only solution may be to record the footage in a tank, rather than in open water. [JB]

ULTIMATE RESULTS

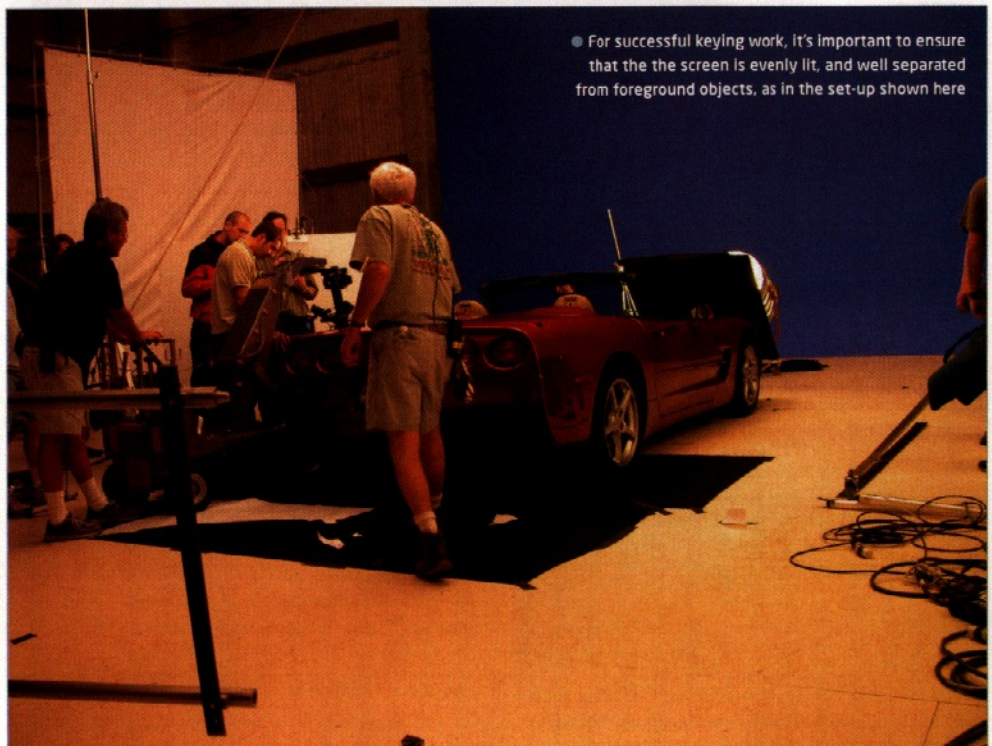
If you have the budget, use an advanced compositing system like *Ultimate* or *Primatte*. Decide on this before arranging a shoot. You'll get even better results if you also use specially manufactured film stocks and paint the background with *Ultimate* blue or green. In addition, your

LIGHT THE FOREGROUND FIRST

Light the actor or foreground elements first, then add extra fill lights to make the background as even as possible. Doing things the other way around tends to be a source of problems in the shadow areas and will mean a lot of clean-up work is required later on. Make sure that the lighting in the subject responds similarly to that of the background. A simple test is to put a known element like a grey ball or card on the subject, and then the background. [JB]



● Although most background replacements are done on footage shot against a blue or green screen, other colours may be used. A black screen is especially useful when shooting smoke or water



● For successful keying work, it's important to ensure that the screen is evenly lit, and well separated from foreground objects, as in the set-up shown here



lighting set-up should reflect the compositing system you're using. For example, if you're taking advantage of *Ultimate*'s advanced spill-removal capabilities, you should place more lights at the sides of the set to compensate for the way the edges of the actors will be darkened once you apply the removal process. Remember that *Ultimate* works by colour modulation, while *Primatte* is based on luminance. **[JB]**

MIRROR THE FLOOR

A neat trick to reduce spill from a green floor is to lay down a mirrored surface (like mirror plex or mylar) and have the actor walk on that. From most angles, the camera will see the reflection of the greenscreen behind the actor, but the actor won't be lit by green reflected light bouncing up from the floor. One possible drawback is that the actor's reflection will appear in the floor and so you'll need to roto out the reflection. However, this can sometimes actually be an advantage if the actor is to be placed on a polished floor or wet surface. Compositing the reflection with a 'screen' function, and maybe some distortion, can really lock the actor into the scene. **[BS]**

HIRE A DECENT CAMERA

Where possible, use 35mm film cameras (or the new HD digital cameras) for bluescreen work. 16mm shouldn't represent too much of a problem, but don't use domestic DV cameras, and never Hi8 or S-VHS. If you don't have a choice, at least use a proper DV camera that's able to record frame-based material, and when digitising, get the maximum quality you can. Your mattes will need a lot of work before they're of acceptable quality, but at least it'll be possible to do serious work. **[JB]**

KEEP YOUR DISTANCE

Probably the best tip for bluescreen work is get as much separation between the screen and the foreground as possible. Ideally, they should be at least four metres apart to minimise spill (blue or green light reflected from the screen onto the foreground). However, as the camera is moved further away, both a larger screen and more lights are required, so the actual shooting distance is always a compromise. On location or on a cramped set, it may only be possible to get a metre or so away from the screen. In this



● Laying down a mirrored surface reduces colour spill from a green floor. The actor's reflection can be roto-scoped out, or used in the final composite

WATCH OUT FOR REFLECTIONS OF THE SCREEN IN GLOSSY SURFACES AS THESE CAN CREATE BIG HOLES IN YOUR MATTE

case, try to choose your foreground objects to minimise the effect: a dull black suit will show much less spill than a white silk dress. Using some rim light of the opposite colour (pale yellow for bluescreen work, pale magenta for greenscreen) can sometimes solve the problem. **[BS]**

USE A WAVEFORM MONITOR

If a shot is particularly important, you should get a Waveform Monitor (like the one in *Final Cut Pro*) onto the set and feed the video assist into it. This makes it very easy to detect any defects in the set-up, such as colour deviations (inconsistent colour), variations in luminance levels or non-homogenous lighting. **[JB]**

USE A SEPARATE BEAUTY PASS

Where possible, ask for the Telecine colourist to provide a technical grade and matching beauty pass; the first to pull the matte and the second to use as a fill. Film can hold a much wider range of colours than digital tape formats, so the colourist can select a colour correction to increase the separation, making it easy to pull a really clean key. Similarly, the beauty pass can be corrected for spill, or even heavily colour corrected, without fear of compromising the key pass.

Even if the shot is for TV, it's sometimes best to get a full 10-bit log 2K scan and work from that. The extra resolution and deeper colour space will give you the best chance of pulling a matte. **[BS]**

FOCUS ON THE INVISIBLE

When actors are shot in front of a bluescreen, you frequently want them to look at something that's not there. If they get this wrong, your 3D work will be wasted because the shot will seem fake to the audience. If you want your actor to focus on something close to them, you can hang a tiny thread just in front of them. This makes them focus on the empty space, positioning their eyes accordingly. It's a subtle difference, but it instantly creates realism. Make sure the thread doesn't pass in front of the actor's skin as seen from your camera or it'll show up. **[CK]**

USE FEWER, SMALLER SCREENS

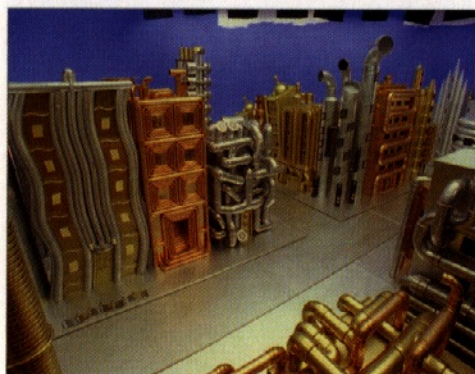
Avoid covering the whole frame in coloured screens if at all possible. If you can cover the action with a few well-placed small screens, it will cause a lot less problems for lighting and spill, making the shot much more believable. **[BS]**

DIFFERENCE MATTES

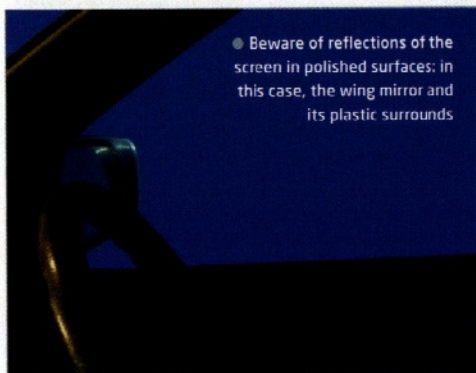
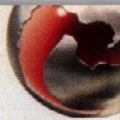
A useful quick tip is to shoot the bluescreen on its own as an additional piece of reference footage. That way you can 'help' the chroma engine (if it's advanced enough, or you can do it by hand if not) to differentiate between the foreground and the background. **[JB]**

KEEP THE LIGHTING EVEN

One of the most important things when shooting a blue or green screen is to make sure that it's evenly lit. This can be difficult to judge once the lights have been turned on. You



● Although unavoidable in some shots, slight variations in the lighting of the screen will create problems later on. Viewing the set through a brown gel can help you to spot inconsistencies



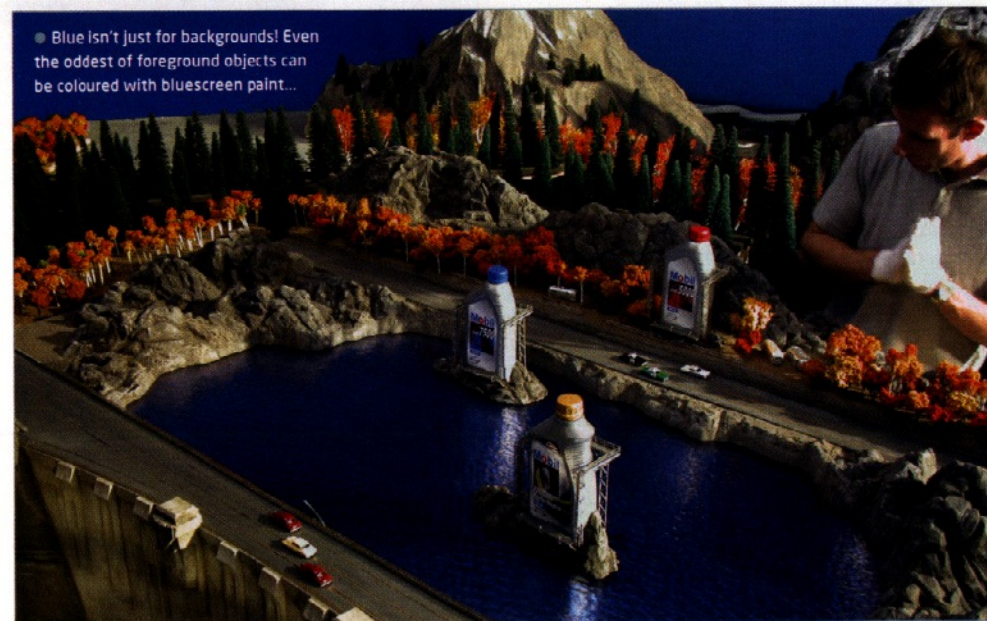
can see much better by looking through a piece of lighting gel: brown for bluescreen and magenta for greenscreen (or, at a push, dark sunglasses). By choosing a piece of gel of the opposite colour, you should be able to see all the dark and bright spots easily, and this will enable you to adjust the lights to compensate. **[BS]**

MOTIVATING A SCENE

Nothing sells a shot like a good performance, so give your actor as much material to work with as possible. Actors use their imagination all the time, but many are overwhelmed by the depth of imagination required on a bluescreen set. If your 3D artists have created roughs of the background landscape, or the robot, monster or animal your actor is meant to be looking at, let your actor see them. **[CK]**

WATCH FOR REFLECTIONS

Watch out for reflections of the screen in glossy surfaces. These can be a nightmare, creating big holes in your matte. While objects like chrome teapots or silver space suits are obvious danger areas, even more subtly reflective objects – such as polished wood, shoes or spectacles – can cause problems. Dulling down surfaces with anti-reflective spray can help, as can adding extra light to the problem area. It may also be possible to place a small black or white flag on



AFTER EFFECTS | Using the Magic Bullet Suite plug-ins



01 **Smoothing the rough edges**
Magic Bullet Suite 2 (from Red Giant Software) adds a film-like motion blur to your footage. Normally, blur is a problem for chromakey because it can make the matte difficult to define. *Magic Bullet's* motion blur is subtle, and pixellated edges are made smooth. If you zoom in on the actor's edge, you'll see that whether or not there's spill, the border between actor and bluescreen is pixellated. *Magic Bullet* takes this away, so you can pull an incredibly clean matte. This will mean the *Magic Bullet* effect has to be used on your entire piece for the effect shot to blend in, but that's no bad thing – the results are excellent with HD, and make pulling a DV matte more than possible. **[CK]**



02 **Rescuing a lost shot**
Despite your best efforts, you can sometimes capture a shot that's extremely difficult to work with. Even when you've removed every visible shadow, there can still be problems due to the way your actor's clothes or face appear against the bluescreen. If an unforeseen problem such as this arises, there's a solution other than rotoscoping. Apply a post filter that adds a degree of misting, such as *Magic Bullet Suite's* Look Suite filter. Render times aren't overly fast and you'll need to add the look to your entire sequence, but this can save a difficult shot. Be certain to add the glow to foreground and background, and be wary of making everything so soft that it becomes blurry. **[CK]**

set to block coloured reflections, while still leaving a keyable background. However, the best way to deal with reflective surfaces is to avoid shooting them in the first place. **[BS]**

GELS, FILTERS AND APERTURES

When setting up the shoot, don't use blue gels to force the background to be blue. This will also affect the floor, which will create problems such as brownish tinting in the final

composite. Similarly, don't use dimmers because this will affect the colour temperature of the lights. You may want to use polarising filters to eliminate glare so that the mattes stay crisp, but don't use fog or diffusion filters because these reduce the contrast of the foreground. Finally, don't shoot with the lens fully open since this will produce shadowing on the corners and is likely to create problems in a complex composite. **[JB]**

EXPECT THE UNEXPECTED

In the end, there will always be some shots where you just have to knuckle down and rotoscope every frame by hand. Sometimes this will be because of lighting or exposure problems, but more commonly it's because something in the foreground unexpectedly shows up the same colour as the background. Common examples include the pale blue shirt that turns out to be a perfect digital blue when in shadow, or reflections of the screen in the model's perfect white teeth. This will make them vanish from the final shot, which is never a good look! **[BS]**

DON'T FORGET TO ROTOSCOPE!

Sometimes the smart decision is not to use a coloured screen at all and to rotoscope each frame by hand. That way, the lighting isn't compromised and the shot will look much more natural. It takes some skill and patience on the part of the roto artist but it's often the route that's chosen by the top effects houses, simply because it looks best. As a rule of thumb, if a shot is under 50 frames in length, it's usually easier to rotoscope it than to use a coloured screen. **[BS]**



PAST ISSUES

Issue 64

Understanding fundamental animation principles, and setting up a basic bounce cycle

Issue 65

Using timing and deformations to inject personality into the hopper's movement

Back issues: page 103

FUTURE ISSUES

Issue 67

Making use of the control rig from issue 66 to change the personality of the character

Subscribe today: page 40



SOFTIMAGE|XSI

Get started in animation Part 3

In the previous parts of our series of beginners' animation tutorials, we injected some personality into our hopper character. This issue, we show you how to give him a simple control rig

BY OLA MADSEN

FACTFILE

FOR

Softimage|XSI

DIFFICULTY

Elementary

TIME TAKEN

1-2 hours

ON THE CD

- Start and finish XSI scene files
- Full-size screengrabs
- Final animation

ALSO REQUIRED

The XSI Mod Tool, a free learning version of XSI, can be downloaded from www.softimage.com



Rigging. A word that many 3D artists associate with hours of frustration, grey hair and too much caffeine. But while sensitive souls may shiver at the mere thought, the difficulty of rigging - the process of creating a set of controls that modify a character's pose, rather than having to move every point on the model by hand - is often exaggerated.

Just as eating spinach is important if you want to grow strong, rigging is a crucial part in successful animation. While I wouldn't go as far as calling it the 'spinach of 3D', you could think of it as adding essential vitamins to your CG diet. Although it adds complexity to your animation, there's only so much you can achieve without it.

This tutorial marks the mid point of the 'Get Started' series. Equipped with the fundamental principles, you should now be all set to bring the animation of your hopper to the next level. Last issue we introduced a bit of personality into the character's movement by making use of the Quick Stretch deformer. This approach based the hopper's character on his actual motion. In reality, however, it's usually the other way around. Imagine two people jumping up and

down, where one is overweight and the other a tad slimmer.

Although they're performing the same action, the way in which they do so will be quite different, due to their different physiques.

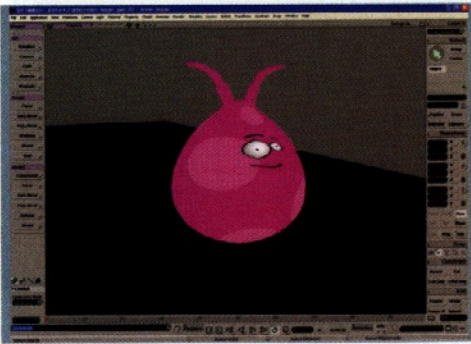
In other words, solely animating the hopper's position and overall scaling won't be sufficient for us to successfully create the illusion that he is really alive. In order to do this, we'll need a solution that enables us to strike any given pose we see fit but, at the same time, is intuitive and easy to use. To do this, we'll create a simple rig that enables us to control the pose of the hopper more precisely.

All the files needed to complete this part can be found on the CD. The tutorial uses Softimage|XSI, but if you don't own a copy, you can download the free educational version (the Softimage|XSI Mod Tool) at www.softimage.com/products/Mod. The two previous parts can be downloaded from our site, www.3dworldmag.com.

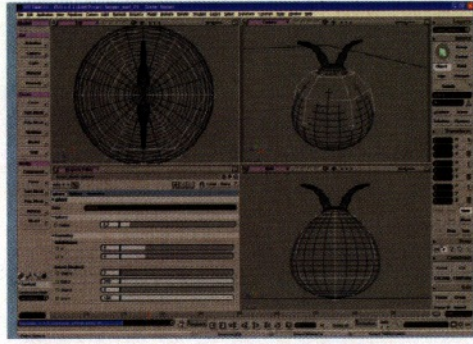
When not bouncing around the Swedish studio on his hopper, Ola thinks up weird and wonderful spinach analogies and animates everything from medical treatments to teddy bears [w] www.digitalcontext.se



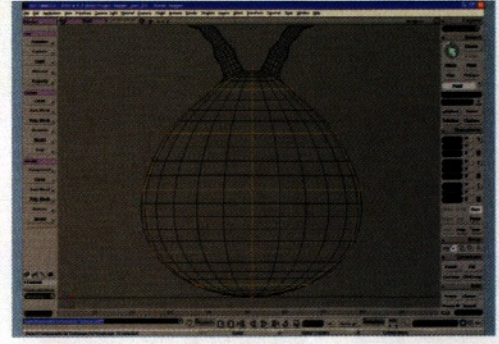
STAGE ONE | Creating the control cage



01 Start by opening hopper.scn from the CD. While we could animate the shape of the hopper's geometry directly, the mesh holds too many points to actually do so efficiently and maintain the overall control of the output. The idea is to set up and animate another object at a much lower resolution, and use its deformations to control the hopper's shape.

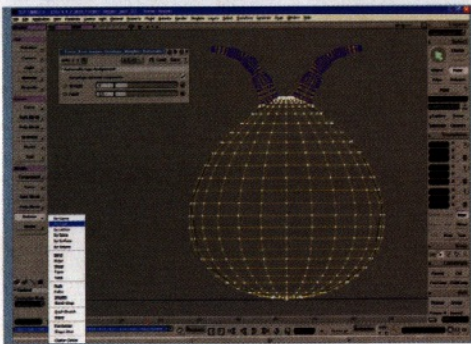


02 While this could be any object, the closer it is to the hopper's overall shape, the easier it'll be to predict how the final deformation will turn out. From Get > Primitive > Polygon Mesh, choose Sphere. In the Sphere Property editor, set the radius to about 4.2 and decrease the U and V subdivisions to 6. Next, move it about 4 units upwards so it aligns with the hopper.

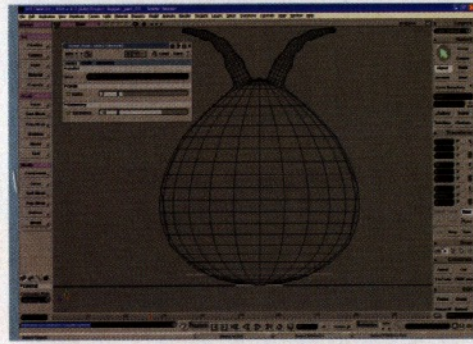


03 Now we should make the edges (or points) on our new object match up better. Press [T] to switch to Point Selection mode. In the Front or Right viewport, select each horizontal row of points, and move them either up or down so they align with the edges on the hopper geometry. Select each row and scale them so they exceed the hopper geometry (refer to the hi-res screenshot on the CD).

STAGE TWO | Controlling the cage



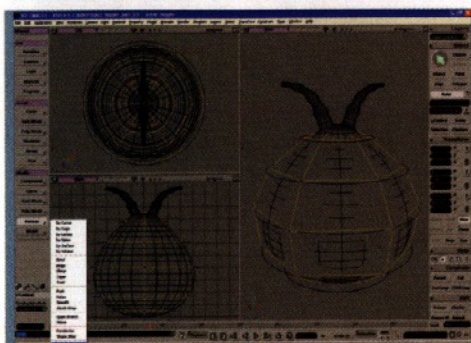
04 With the control cage complete, we'll need to attach it to the geometry of the hopper. Select the hopper, press [T] to enable point selection, and select all the points except those on the 'ears' (we'll control these separately). From Model > Modify > Deform, click By Cage and pick the Sphere. In the Property page, change the falloff to about 3.5 to get a smoother falloff on the deformation.



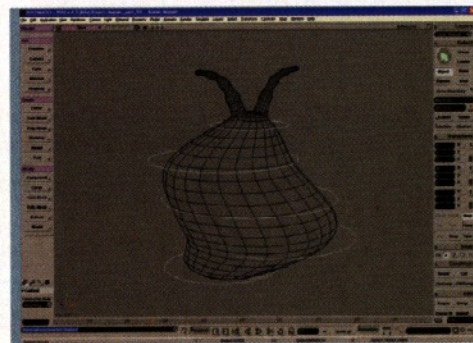
05 Due to XSI's handling of geometry animations, we'll approach this differently to animating the Sphere's points directly. Click Model > Get > Primitive > Curve, click Circle and set the radius to 1. Rotate it 90 degrees along the X-axis and align it with the very bottom point on the Sphere. Press [CTRL]+[D] to duplicate and align it with the row of points above on the Sphere. Change the radius to 3.



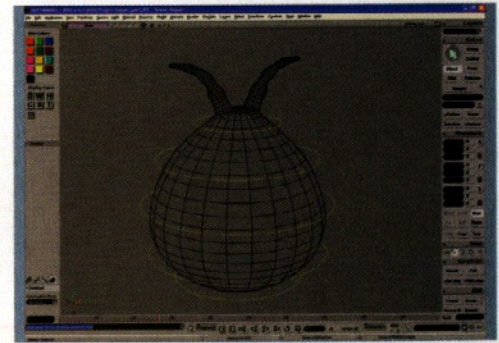
06 Press [Ctrl]+[D], set the radius to 4.2 and align the new curve with the next row of points. Make another duplicate, move it up to the next row and set radius to 4.5. Create another duplicate, set the radius to 4 and align it to the next row. Duplicate again, set radius to 2 and align with the next row. You should now have six circles. Select them and, from the MCP, click Transform > Freeze Rotation.



07 Select the Sphere and press [T] for Point Selection mode. Select the point at the bottom and, from Model > Modify > Deform click Cluster Center. Pick the corresponding circle (radius 1). On the Sphere, select the point rows just above, click the Cluster Center and pick the corresponding circle (radius 3). Repeat for the next three rows. Now, select the last row but select the top point too.



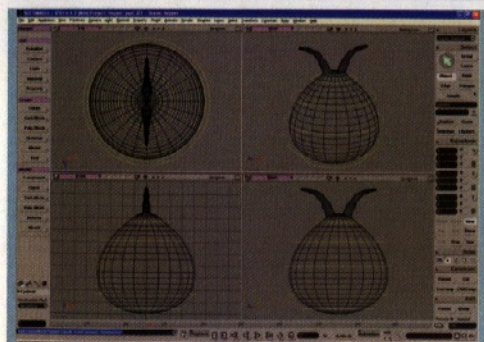
08 Click the Cluster Center again, and pick the corresponding circle (radius 2). Try moving each circle to ensure all the previous steps were completed successfully. As we now control the shape of the Sphere by the use of our circles, we no longer need it to be visible, cluttering our viewports. So, select the Sphere and press [H] to hide it.



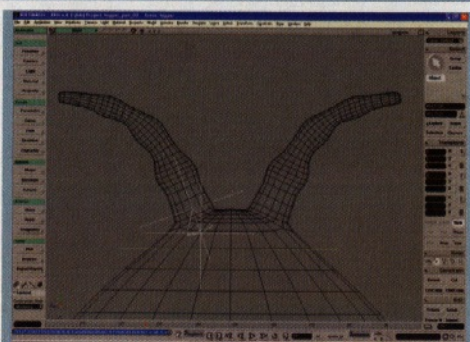
09 While the Sphere is hidden, it can still be a bit difficult to distinguish the different circles. Click on the Palette icon (or [CTRL]+[4]) in the lower left corner to switch to the Palette toolbar. Click one of the colour palettes (preferably not pink or black, given the scene's colour scheme) and select each of the circles. Click the Toolbar icon to return to the Model toolbar.



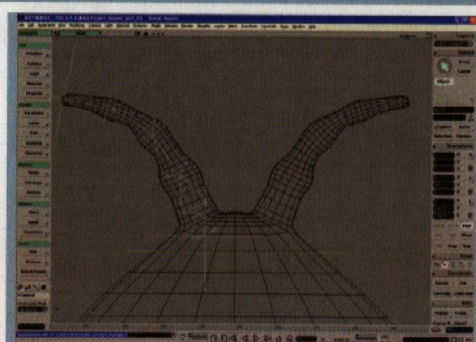
STAGE THREE | Controlling the ears



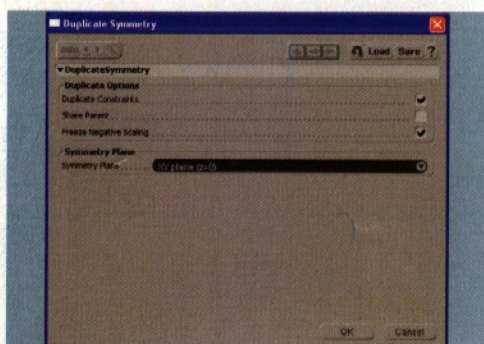
10 The design of the 'ears' requires a different approach from the body if they're to be controlled and animated efficiently. For this scenario we'll use five 'bones' (control rods) for each ear. Because the ears are excluded from the effect of our cage object, they won't be affected by any movement you make to the cage. To make sure they stay in their proper place, we'll need to parent them to the appropriate part of the cage.



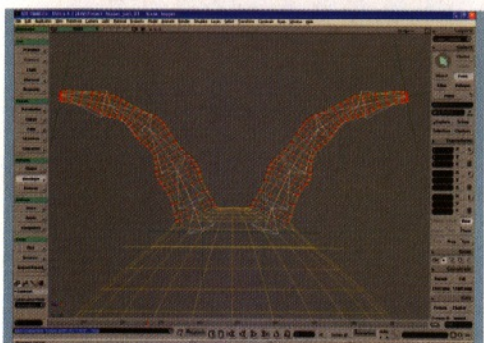
11 Maximise the Right viewport. Zoom in on the ears and press the [2] key on your keyboard to switch to the Animate toolbar. From the Animate > Create > Skeleton click 2D Chain. Click slightly below the area where the right ear (which is the one you'll see on the left in the viewport) starts, to set the initial position for our chain. Next, click slightly above the area where the ear begins to create the first bone.



12 Click at the centre of the first (lowest) bulge of the ear to create the second bone; click at the next bulge to create the third; click the third bulge for the fourth, and finally click at the very end of the ear to create the fifth bone. Click on the right mouse button to end the chain. Please refer to the high-resolution version of the screenshot above on the CD to see the placement of each bone.



13 Instead of going through the process of creating the bones again, we'll simply copy them to create the chain for the left ear. Select the chain root (displayed as a green cross) with the middle mouse button to branch-select it. From the Animate > Create > Skeleton, click Duplicate Symmetry. In the Duplicate Symmetry dialogue box, change the Symmetry Plane to XY Plane and press OK.



14 Select the hopper, press [T] and select all the points for both ears. From the Animate > Deform > Envelope, click Set Envelope. If asked about Envelope Construction Mode, click 'Yes'. Now, pick each bone on both chains (ten in total). Click on the right mouse button to end the picking. From the Animate > Deform > Envelope, click Smooth Envelope Weights. Set the Neighborhood depth to 3 to smooth the weight.



15 Activate the Constraint Compensation button (cnsComp) and select both chain roots. Click Constrain > Pose from the Main Command panel and select the top circle. In the Pose Constraint PPG, switch to the Options tab and uncheck the Scaling checkbox to deactivate it. Next, create a null from the Get > Primitive menu and move it up 3 units. Activate the child transform compensation button (ChldComp), select all six circles, the

hopper and the hidden sphere and click the Parent button. Now, with the middle mouse button, select the null to make it the parent of all the objects. By arranging your objects in 'parent-child' hierarchies, as well as setting constraints, you'll not only get a more organised scene but your overall control of the characters will also be greatly enhanced. The control rig is now complete, and in the next issue we'll be using it to create an animation. ●



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LEGO WARS

Hailed as more than just Star Wars in plastic brick form, LEGO Star Wars: The Video Game had to add a spark to the market. For the makers, the main focus was in creating a game people actually wanted to play - and the logistics of how the characters would hold their lightsabers, of course **BY JON JORDAN**



● One of the challenges for the gamemakers was in transforming the stiff yellow plastic LEGO figures into convincing digital forms, while also staying true to the look of the film's characters

You'd think it would be a straightforward task: two of the strongest global entertainment brands combined into a single computer game. Surely you could even title it 'LEGO Star Wars: The Hit Video

Game'. If only... As demonstrated by the pitiful legacy of games based on previous licences, gamers have become harder to please recently. Of the dozens of *Star Wars* games, only a handful have enjoyed both critical and commercial success, and in the case of the more children-oriented LEGO games, the situation has been worse still. In a strange way, this proved to be the genesis of the *LEGO Star Wars* story.

Two years ago (in a galaxy not so very far, far way – Beaconsfield, England, in fact), a rebellion was being planned. Chief members of the alliance were Tom Stone and Jonathan Smith, then respectively MD and Executive Producer of LEGO Interactive. It had been releasing licenced products such as *LEGO Racers*, *LEGO Football Mania* and *LEGO Bionicle* for years, but Stone and Smith decided that enough was enough. They proposed an ambitious, and risky-sounding future: leave, buy the rights to make LEGO computer games themselves, and talk to Lucasfilm about making a LEGO-based *Star Wars* game (LEGO *Star Wars* being the toy seller's most successful range)

"I EXPERIMENTED QUITE A LOT WITH THE LEGO CHARACTERS' LIMBS... WE THOUGHT IT WOULD BE FUNNY TO HAVE A PARADE OF STORMTROOPERS WOBBLING AROUND WITH STIFF LEGS."

JEREMY PARDON, LEAD ANIMATOR

Even considering Stone's previous employment as the Head of European Studios for giant game publisher Electronic Arts, it was a mark of their discerning business skills, enthusiasm and persuasive powers that both license holders agreed, albeit with the proviso (in the case of Lucasfilm) that their first game would support the theatrical release of *Star Wars: Episode III – Revenge of the Sith*. Now all the newly-established Giant Interactive Entertainment had to do was make the game, which reprises the characters, plots and environments of *Episodes I, II and III* in LEGO form, and complete and release it by April 2005.

Despite never having worked with the developer, Smith says the first choice was always Cheshire-based Traveller's Tales. "We've known its games going back more than 15 years," he says. "There's barely any other company with that track record, not to mention reputation for robust technology and focused delivery."

TRAVEL GAMES

A low-key outfit, Traveller's Tales has nevertheless created games based on big-name brands ranging from film properties such as Disney/Pixar's *Toy Story* and *Finding Nemo*, as well as interactive characters such as Vivendi Universal's Crash Bandicoot and Sega's Sonic the Hedgehog. "I remember our first meeting with Tom and Jonathan," says Lead Artist James Cunliffe who, like many of Traveller's Tales' senior staff, has worked at the company since the mid '90s. "They had bought along the LEGO *Star Wars* kits and got us playing with them while we were having the meeting. I thought, 'This bodes well!'" [As *3D World* went to press, Traveller's Tales had just announced its merger with Giant Interactive Entertainment].

So the game was underway. But, as could have been expected, it took longer to get the foundations right. "Our initial ideas



● With characters like Jango Fett, who has a jet pack and dual pistols, there was more scope for actions like spinning the pistols, cowboy-style

FACTFILE

PROJECT

LEGO Star Wars: The Video Game

FORMATS

PlayStation2, Xbox, PC

DEVELOPER

Traveller's Tales

PUBLISHER

Giant Interactive Entertainment/Eidos

WEBSITE

www.legostarwars.com
thevideogame.com

DURATION OF PROJECT

18 months

DEVELOPMENT TEAM SIZE

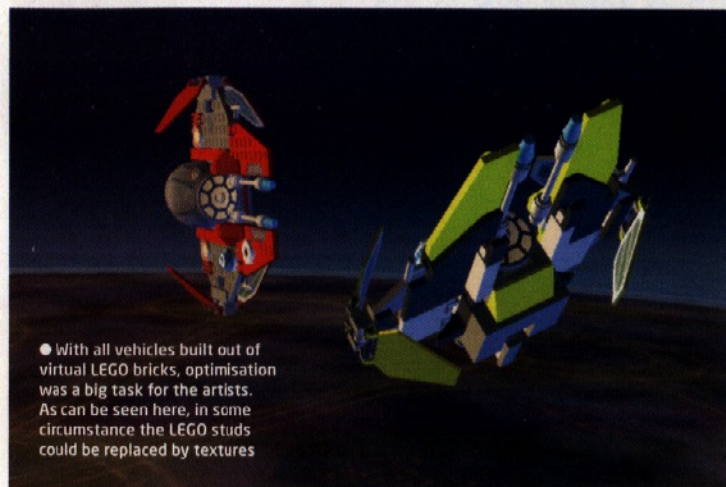
- Nine game artists
- Two cutscene artists
- Three animators
- Five programmers

ESTIMATED BUDGET

£3.5 million

SOFTWARE USED

Maya, Photoshop, in-house level design, object placement and particle tools



● With all vehicles built out of virtual LEGO bricks, optimisation was a big task for the artists. As can be seen here, in some circumstance the LEGO studs could be replaced by textures



● As well as the characters' flexible actions, they're also blessed with blend shape animations for their eyes and mouth so they can display emotions

► were specific but also abstract," says Smith, in an appropriately confusing manner. "We had a straightforward framework and some game features in mind, but it didn't amount to a game, or any communicable vision."

That was down to the team at Traveller's Tales. "Typically, we don't get involved in a lot of paper design before we start work," says Cunliffe. "Companies such as Disney are more picky about what their characters look like than the level design."

Giant, and (by association) Lucasfilm and LEGO, were playing a different game, though, and required paper-based designs: "They were really keen on their pieces of paper," says Cunliffe. "We worked on a gate system where gate one is getting the documentation right and gate two is a playable level. It took us about five months to get from gate one to gate two..."

ANIMATING LEGO MEN

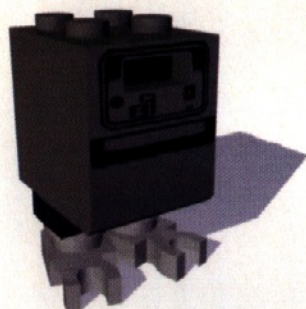
Part of the problem was transforming the stiff yellow plastic figures into a convincing digital form. "I started off with test animations experimenting with having two bones for the LEGO character's leg, or using a rubber hose-type approach where the whole leg would bend," says Lead Animator Jeremy Pardon. Another approach featured rigid limbs. "We thought it would be funny to have a parade

of Stormtroopers wobbling around with stiff legs," Pardon recalls. It wasn't what Giant had in mind however. "We wanted the characters to look and act like cool videogame characters and not be restricted by the influence of plastic. These had to be the LEGO Star Wars characters of your imagination, not of the playroom floor," says Smith.

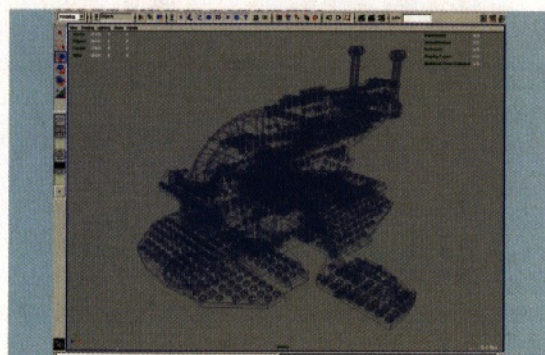
So it was back to the drawing board that was *Maya*. What Pardon ended up with was a skeleton consisting of 24 bones. "The legs are quite rigid, but I placed a subdivision in the middle," he says. "When it bends, it creates this knee shape which looks more natural and real than the other solutions we tried."

The rig has a head-based locator, too. This helps overcome the Gimble Lock inherent in some of the wilder attack animations, of which each playable character has at least seven, as well as enabling characters to be scaled. "Most characters are the same height but we had to change some," Pardon explains. "[General] Grievous, for example, just wasn't scary enough when he was the same height as the other figures. He also has thin limbs, which make him look even smaller. We scaled him up to one and a quarter scale."

A more serious problem was posed by the LEGO characters' short arms: "They're so short, getting their hands together to hold a lightsaber is impossible," Pardon laughs. His solution proved to be another vindication of Giant's decision to use Traveller's Tales. "I used a trick I learned working on the *Toy Story 2* game," he says. "Back then, I was trying to get Buzz Lightyear to push his laser button, but couldn't get his arm right. I studied the film and discovered they'd cheated and extended it. I thought, 'Well, if they



● "These had to be the LEGO Star Wars characters of your imagination, not of the playroom floor," says the game's Executive Producer, Jonathan Smith



● Jango Fett's Slave 1 was made of curved bricks, which enabled the gamemakers to bend the rules when it came to creating other ships

TRICKS WITH BRICKS | How models were optimised in virtual LEGO to run in real-time

For the artists at Traveller's Tales, working within an existing license such as LEGO Star Wars made life easier: "There were only six characters in the game that weren't already LEGO characters so most of them came effectively pre-approved," says Lead Artist James Cunliffe. The same was true for the game's vehicles.

With this in mind, the artists attempted to build the vehicle models in virtual LEGO bricks, using only shapes available in commercial LEGO packs. "Originally, our idea was to make sure people would be able to build our models in real bricks, but we found we did have to cut some corners," explains Cunliffe. Particularly problematic were the smooth curves of the Naboo Royal Starship. "It wasn't too bad because we could use many of the curved bricks from Jango Fett's ship. Slave 1, but there were some shapes we had to cheat," he says. "We've tried to keep it relatively subtle although I'm sure some aficionados will spot them."

A more serious problem was getting the *Maya* LEGO models down to a sufficiently low polygon count so they would run in a real-time game engine. This was partly due to a workflow in which the models were built using virtual LEGO bricks, just as they would if they had been using physical bricks. "We built the models by creating all the LEGO bricks in the Star Wars range and then literally following the instructions," Cunliffe reveals. "It's surprising how quick you get at creating models. It's certainly quicker than real-life because you're not messing around looking for bricks; you can duplicate ten more blocks if you need them."

Once created, however, it took twice as long to optimise the finished models down to size; particularly the LEGO studs. "The first thing I had to do was go through each model by hand and remove any polygons and edges that would never be seen by game players," Cunliffe says. "Then it would be a process of deciding how many

LEGO studs we could replace with LEGO textures. It's important because each stud is 11 polygons. Even on medium-sized models, this can really destroy your framerate."

Conversely though, in some circumstances the stud textures became apparent, falling apart if the angle of the in-game camera became too shallow. The result was lots of careful tweaking as well as judicious use of level-of-detail models, which is when several versions of a model of differing resolutions are used dynamically, depending on how close a character or object is to the camera.

But despite such measures, some LEGO vehicles remained too big for the current generation of PlayStation2 hardware: "The six-legged All Terrain Tactical Enforcer (AT-TE) walker didn't fit so we had to make a two-thirds scale version," says Cunliffe. "It took ages because we had to adapt the instructions and still try to make sure everything fitted together and worked properly."

● One of the charms of *LEGO Star Wars: The Video Game* is that evil characters such as Darth Maul manage to retain some menace despite their diminutive size

can do it, so can I." The result is all the Jedi characters in the game have an extra joint in their forearm. Typically, for human characters, this would be used to model the wrist rotations; this wasn't necessary thanks to the universal wrist joints of LEGO characters, but it did allow Pardon to extend the arms. "It gives us a nice clean shape and when a character is moving you don't notice their arms are longer," he says.

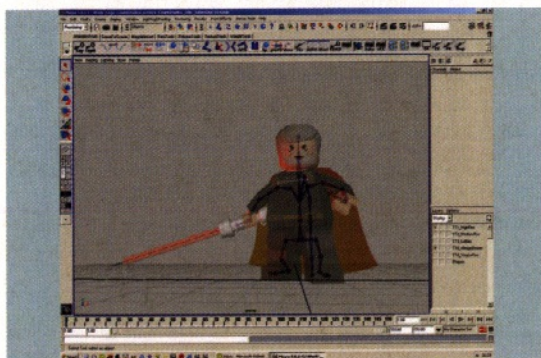
This is just one example of the attention to detail that's been lavished on the game. Developed by (what would be considered, by industry standards) a tiny team of coders, artists and animators, it's been a real labour of love – especially for Pardon, who animated all of the game's 75 characters. It took about five days to complete

"I REMEMBER OUR FIRST MEETING WITH TOM AND JONATHAN... THEY BROUGHT ALONG THE LEGO STAR WARS KITS AND GOT US PLAYING WITH THEM WHILE WE WERE HAVING THE MEETING. I THOUGHT, 'THIS BODES WELL!'" JAMES CUNLIFFE, LEAD ARTIST

the 45 unique animations required for each playable character in the game: "The Jedi were the most difficult characters to do," he says. "There's not much potential variation on offer, whereas with characters such as Jango Fett, who has a jet pack and dual pistols, there was more scope for fun things like spinning the pistols, cowboy style."

But, despite working on one of the coolest game licenses around, some team members have their eyes on other opportunities: "Both the lead programmer and I like the idea of working on a game with only a single main character," says Pardon. "Instead of a massive 50 playable characters with an OK moveset, it would be really great to work on only one character with an amazing moveset." And as it would be a Lucasfilm license, maybe that pipedream won't be such a fantasy after all. So, watch this space for *LEGO Indiana Jones: The Video Game*...

LEGO Star Wars: The Video Game is out now for PlayStation2, Xbox and PC. There's also a GameBoy Advance version available (not developed by Traveller's Tales)



● Jedi characters in *LEGO Star Wars: The Video Game* have an extra joint in their forearm which enables them to use their lightsabers effectively





● A still from Passion Pictures' new Gorillaz video, the first in nearly four years – hasn't Noodle grown since we last saw her?

Antoine Moulineau

After an absence of nearly four years Gorillaz are back with a new video that, as always, mixes 2D and 3D to great effect. We speak to the supervisor on Feel Good, Inc.

BY BEN VOST

Tell us about yourself...

I'm 25 years old and I discovered 3D nine years ago – I'm self-taught. I started my career at Duran six years ago – I worked there for about four years. I was then freelance for different companies and I came to work for Passion Pictures two years ago. In September last year I came back to France to supervise a series at Def2Shoot and returned to Passion in February to work on the new Gorillaz videos.

How did you discover LightWave?

An Amiga fan friend of mine first showed me it in 1994, but I first used *LightWave 4* on the PC in 1996.

What do you particularly like about LightWave?

What I like above all about *LightWave* is its clear, readable interface and its simplicity. It always astonishes me to see the results that can be achieved in very little time. Its render engine is excellent quality too.

Do you prefer modelling, animation, texturing, lighting or rendering?

I find myself specialising more and more on the lighting/rendering/compositing side of things.

What's your favourite tool in LightWave?

The best tool in *LightWave* in my opinion is HyperVoxels – it was one of the most important factors in us deciding to use *LightWave* for *Feel Good, Inc.*

What sort of computer are you using right now?

At home I have a Dell Inspiron 9200 laptop with a Pentium M 2GHz and 1GB RAM, and at work I use a Dell dual-Xeon machine at 3.06GHz with 2GB RAM.

Are there any plug-ins you wouldn't be without?

Sasquatch is without doubt the plug-in I find indispensable in *LightWave*. It was used a lot to make the grass in the video.

How many people worked on the 3D side of 'Feel Good Inc'?

At the start of the project, one person created a layout and then five other artists came to model, texture and light.

What's a layout?

It's a sort of animatic where you set up each scene with low definition objects and simplified animation. It helps to largely



● Although the characters in the video are completely 2D, this bass guitar is a 3D object created in *LightWave*

● Inspired by Miyazaki's *Laputa*, but with a flair of Passion's own, Noodle's flying island is a complex mix of 2D and 3D elements.



visualise a shot and check it works in editing before you really begin its production. It's kind of a more precise pre-viz.

How long did the project take?

I would say about six weeks for the 3D side.

What was your role on the project?

I was supervisor of the 3D side of the video, and more specifically in charge of the floating island and windmill in the clouds, along with the intro sequence.

What did being a supervisor entail?

I was in charge of finding the best technical solutions for scenes with tough technical challenges (grass, clouds, trees and very heavy geometry). I textured, and helped model and render the shots with the island and windmill. I also had to do the camera mapping and the compositing for the intro shot.

Was the floating island with the windmill inspired by Hayao Miyazaki's *Laputa*?

Yes, but the artistic director, Daniel Cacouault, who also painted the skies, brought a luminosity to the scenes that was different to Miyazaki's – it gave the video just that bit extra.

How did you mix the 2D and 3D in this video?

The 2D is made traditionally – hand-drawn on paper, scanned and coloured with *Toonz*. Afterwards, everything was composited in *After Effects*.

A mix of 2D and 3D is never easy. What was the hardest bit for you?

2D and 3D are two processes that are completely separate during the making of the video and yet they have to match perfectly when it's time for compositing. You have to work very carefully to the storyboard and layout so that you can check the cameras and scenes at the earliest opportunity.

Are the trees and clouds around the island in 3D? How were they created?

The trees were created in 3D in *LightWave's* Modeler and were animated using displacements in Layout. They were calculated

separately from the island with a simplified lighting rig to keep down render times and give a little more flexibility.

The clouds were also created separately with a simplified island in a separate scene, with help from Lukasz Pazera working on passes for the cloud HyperVoxels while I worked on the island.

How did you create the sequence where the island comes out of the clouds?

The biggest problem with this sequence was that we see the island both from right up close and very far away, all in 350 shots. So we used a lot of compositing. To begin with, we had to define the different layers that needed to be made in 3D.

The first step, once the animation and the layout were signed off, was to render an Ambient Occlusion pass to avoid radiosity rendering during the lighting of the shot. It means that we had two renders, one with Ambient Occlusion, and the other one with the lighting. Afterwards, those two passes were comped together in *After Effects*.

We then needed to create the different layers, such as the grass, the island, the windmill and, finally, the sky (which had previously been painted). Once done, we then had a huge compositing job to put the 3D into the 2D sequence and finally we had to track and match the character in 2D on the island.

As a Frenchman, how do you think you've succeeded at the heart of a very British company?

I think it's down to the fact that I had the chance to start my career a little more than six years ago at Duran [a large and famous French CG studio, based in Paris] where I learned lots of things and had the chance to work on a lot of original, and often well-known, projects. The best examples of this previous work were the videos for *Starlight* and *The Brotherhood of the Wolf* by Nicolas and Christophe Gans.

What's the difference between CGI industries in London and France?

Today, London is where the most interesting projects are being worked on. That's mainly what I miss in France.

What are you working on at the moment?

Right now I'm working on the next video for Corillaz. ●



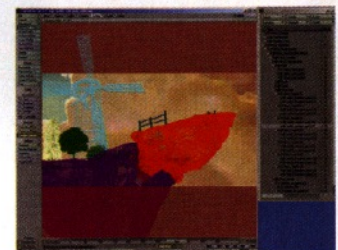
● Russel plays a *LightWave*-created drumkit. The 3D elements of the video took around six weeks to put together



● The island with the windmill emerging from the clouds was one of the hardest shots to pull off



● *Sasquatch*, the hair and fur plug-in by Worley Labs, was indispensable for the grass shots



● Several scenes with elements of varying complexity were used to create the final image in the video

MORE INFORMATION

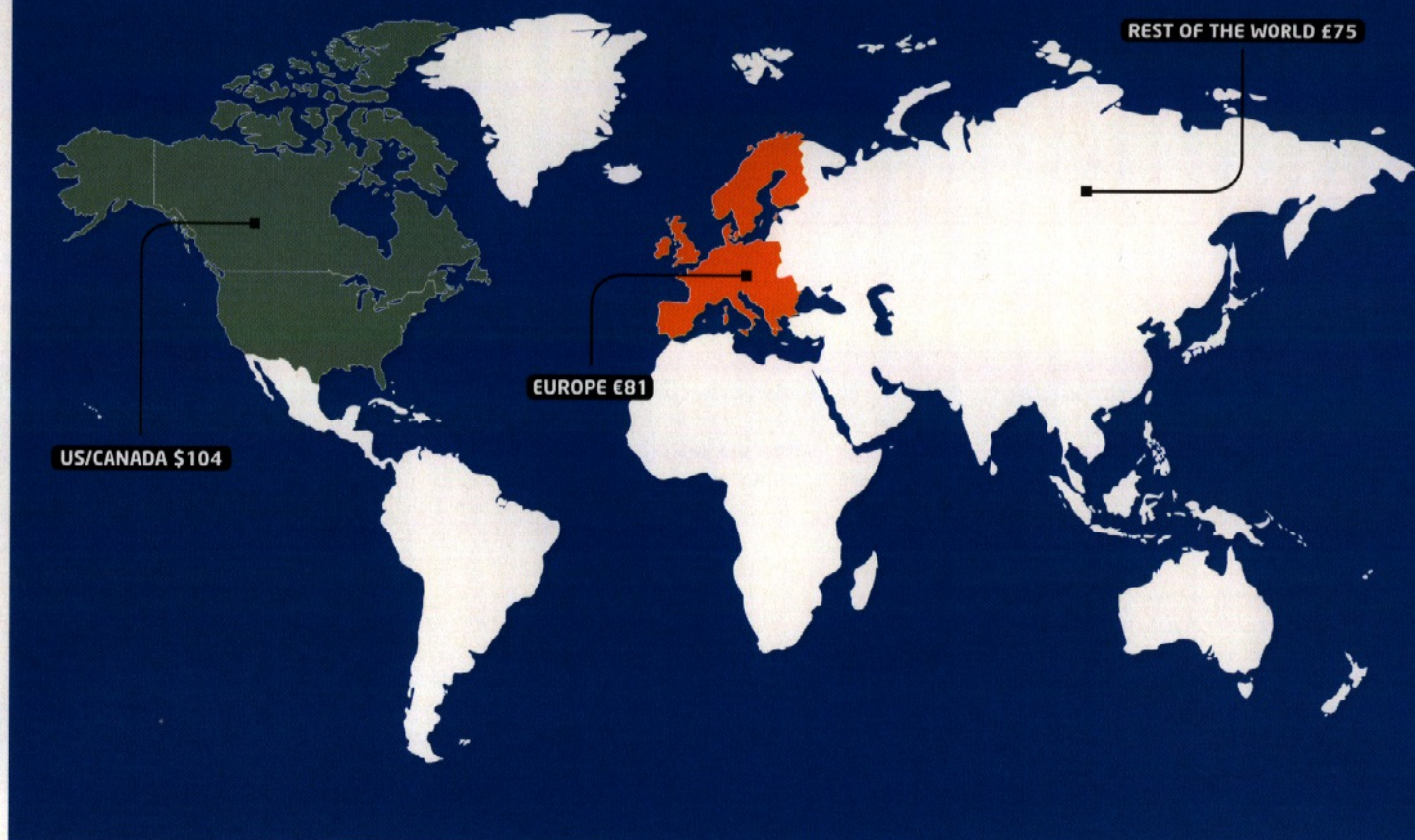
You can watch the *Feel Good, Inc.* video at the Passion Pictures website [w] www.passion-pictures.com/feelgoodinc.html

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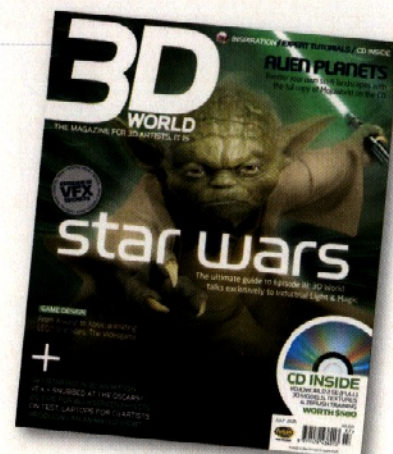


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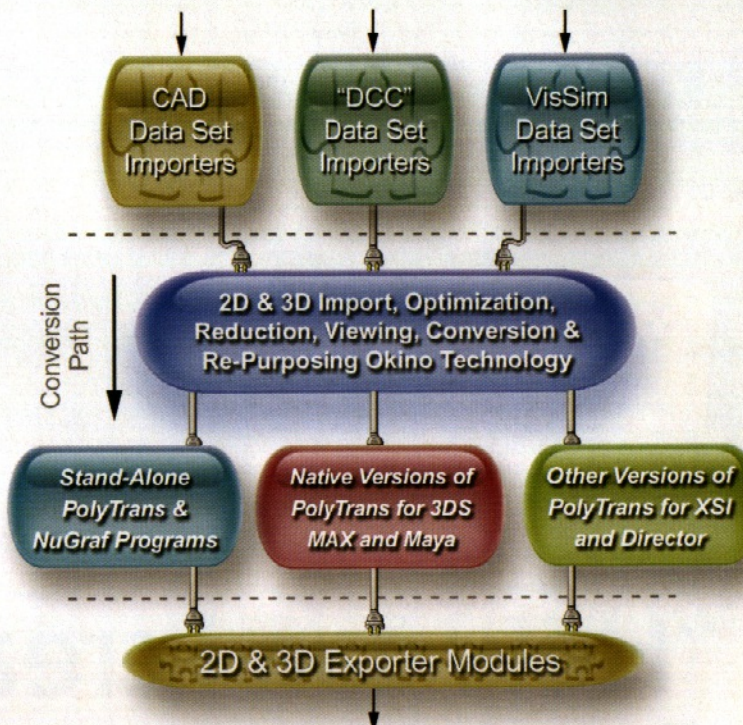
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Q&A

SOLUTIONS / FIXES / ADVICE



QUESTION OF THE MONTH

Submitted by Geraldine Parker-Thomas, via email

• You can create your very own hologram effect, similar to the one in *Star Wars*, relatively easily in *After Effects*. In fact the only problem you should have is deciding whether to be Luke or Obi Wan...

AFTER EFFECTS

"How can I create a Star Wars-esque hologram scene using After Effects?"

FACTFILE

FOR

After Effects 6.5

DIFFICULTY

Intermediate

TIME TAKEN

Three hours

ON THE CD

- Full-sized screenshots
- Live action footage
- *After Effects* files
- Demo QuickTimes
- Completed effects shot

ALSO REQUIRED

N/A

This issue's answer is supplied by Jan Rogowski of the UK-based effects and animation company Red Star Studio. Most of his fantasies have been fulfilled by directing a diminutive receptionist pretending to be Princess Leia.

"So, you're waging a long and bitter galactic war, and you're outnumbered and outgunned by the merciless army of an evil emperor. The forces of the Dark Side have captured your spaceship, and stretched the neck of its captain: defeat seems inevitable. Your only hope lies in somehow getting word to Sir Alec Guinness, a venerable Jedi of great power. But his mobile's out of range, the post office has been privatised and Fed-Ex has yet to go galactic. You turn to your trusty, hologram-recording droid to deliver the message personally: it's then you realise that holographic projection doesn't really exist. Damn. Your heart sinks, and in desperation you turn to an old copy of *3D World* for comfort. Flicking through its tattered pages you

stumble across an article that breathes hope into your soul. So attach those Danish pastries, wield the mighty power of *After Effects* and repel the evil of the Dark Side! While holographic projection may be the work of science fiction, we can create the illusion relatively simply using a camera, a big sheet of blue paper, an office administrator and a firm grasp of visual effects.

R2CD2

This tutorial will guide you through the process of creating a hologram sequence using *After Effects* as a platform, but the theory is equally applicable to other applications.

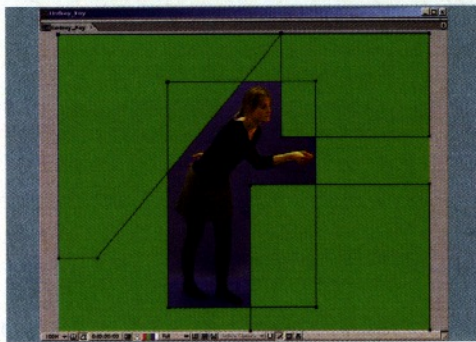
On the CD you'll find example QuickTime movies, full-res walkthrough images and all the source material and *After Effects* project files required to create the sequence. If you're on a PC, copy the Hologram_QnA to c:\ and the *After Effects* files will work; otherwise you'll have to load them and instruct *After Effects* to find the missing footage. Let's get started!"



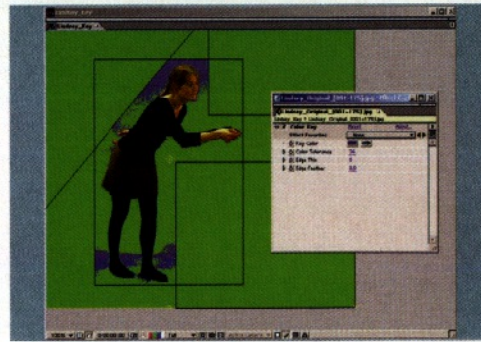
STAGE ONE | Keying the bluescreen



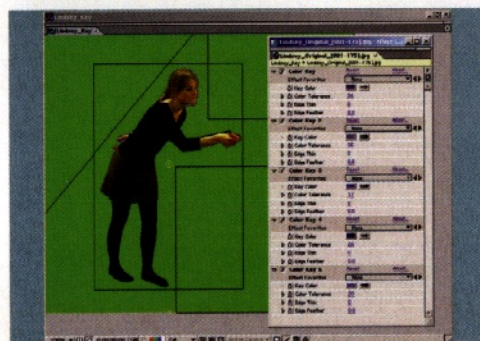
01 Create a new seven-second-long composition at 720x576 called *Lindsey_Key*; to simplify matters we're going to work with square pixels throughout this tutorial. Give it a plain green background colour. Import the bluescreen sequence of Lindsey and drag her on to the timeline. Make sure you interpret the footage, and tell *After Effects* it has square pixels and 25fps.



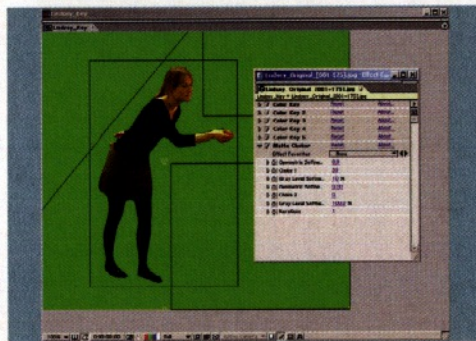
02 Use masks to remove as much of the background as you can. This is called a 'garbage matte'. Basically the idea is to trim as much of the screen as possible, so that the keyer has less background to remove. There's no set way to do this, you just animate masks to remove as much of the unwanted areas as you can.



03 Apply a Color Key (Effects > Keying > Color Key). Use the Eyedropper Tool to select an initial RGB value for the Key Color, and then the Color Tolerance value to specify a selection range. Don't worry about the edging options - just grab a shade of blue from the image and mess with the tolerance values to remove some of the blue.



04 The Color Key works by recognising colour values of pixels, and determining if they fall between your specified tolerances. Duplicate the Color key by selecting it and clicking Edit > Duplicate. Then use the Eyedropper to grab one of the remaining shades of blue, and repeat the process until all the background is eaten away.

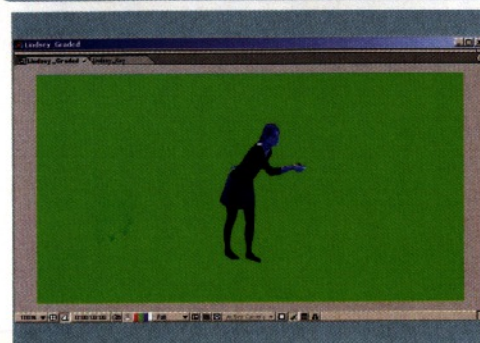


05 There's a bit of blue halo remaining, so use one last effect to suppress this. Matte Choker (Effects > Matte Tools > Matte Choker) will shrink the edges of the Alpha channel to eat away at Lindsey's edges. The default settings work well, but have a go at changing the Geometric Softness (basically blurring the matte) and the Choke values to get something that looks good.

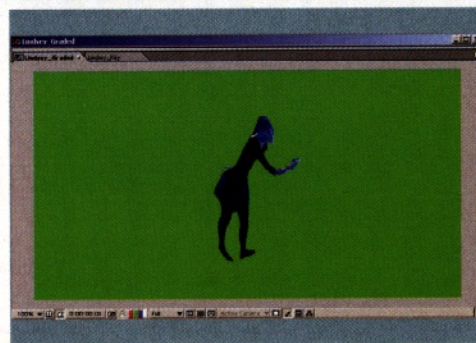


06 Import the first frame of the background plate sequence as a still image for reference, and drag it on to the bottom layer of the timeline. Resize the composition (Composition > Composition Settings). Set its size to 720x380 (all compositions will be this size from now on). Scale down the Lindsey layer to about 55% and position her above the marker on the table. Hide the reference image.

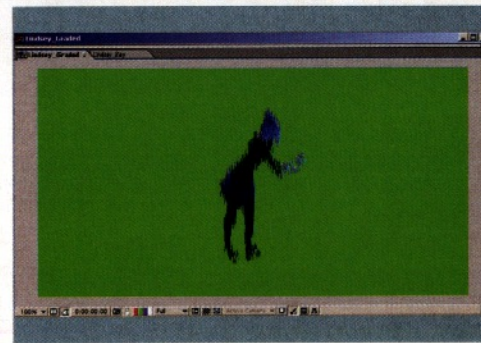
STAGE TWO | Setting up animated distortions



07 Start a new composition called *Lindsey_Granted*. Nest the *Lindsey_Key* composition into it by dragging it from the Project window. Adjust the Hue/Saturation (Effects > Adjust > Hue/Saturation), twisting the hue control to turn her blue. Boost the lightness to 20. Now add a Brightness/Contrast adjustment (Effects > Adjust > Brightness/Contrast), and boost the brightness by 25 and the contrast by 50.

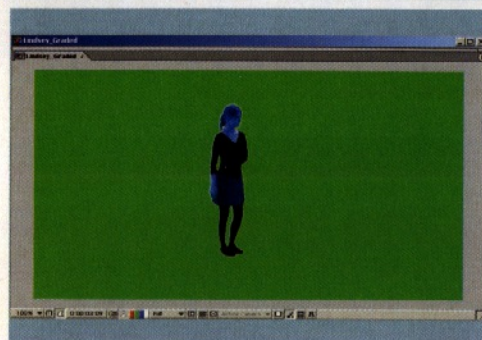


08 Apply a Wave Warp effect (Effects > Distort > Wave Warp) to a new adjustment layer. Set the Wave Type to sine, the Height to 10 and the Width to 40. Leave the rest of the options as they are. Hit RAM Preview to see how the effect is distorting the image. Hit the keyframe button for Wave Height and key the height to be 10 at 0 secs and 0 at 2 secs.

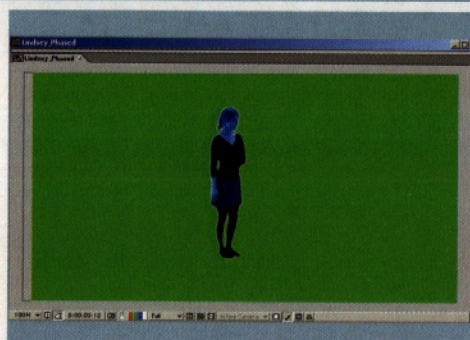


09 Add another Wave Warp effect. Set Wave Type to Noise, and Width to 40. Key the height to 10 at 0 secs and 0 at 2 secs. Add more keys for a Wave Height of 0 at 3.5 secs, then 6 after 3 frames and then back down to 0 after a further 15 frames; this will add a blip of interference. Repeat for a further blip at about 5 secs.

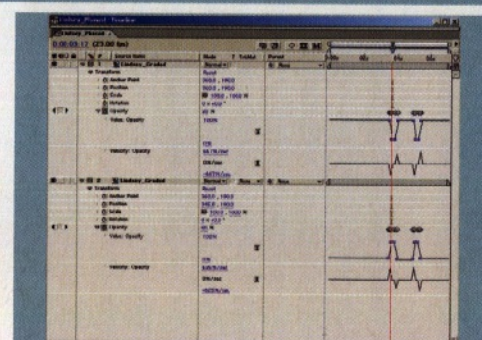
STAGE TWO (Continued) | Setting up animated distortions



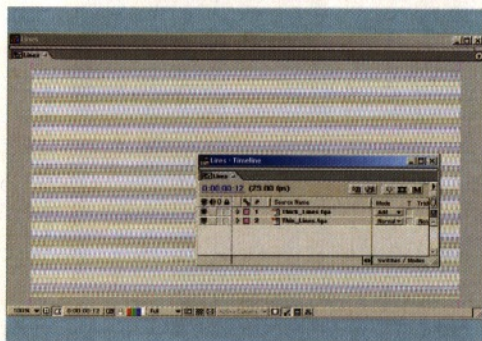
10 Duplicate Lindsey_Key. Remove the Brightness/Contrast effect from the bottom layer. Go into the Hue/Saturation options and desaturate the image while boosting lightness to full. Apply a Gaussian Blur filter (Effect > Blur and Sharpen > Gaussian Blur) set to 2 pixels. Go to Effect > Channel > Alpha Levels and boost the gamma to 2; this gives Lindsey a glowing halo.



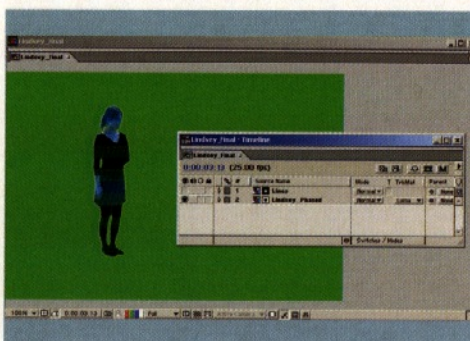
11 Now introduce phase distortion to the hologram. Create a new composition called Lindsey_Phased, and drag our last composition, Lindsey_Graded, into it twice. Select the bottom layer and drag it around; you should see a second version of Lindsey. Set the X position of the bottom Lindsey slightly to the left, and set the opacity to 10; you should see a faint ghost of the image.



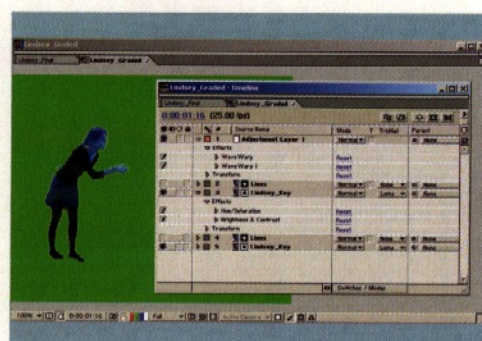
12 To achieve the phase effect, key the layer opacities to blend between the two layers. You should also time the phase shifts to match up with the distortion effects already in place. The basic formula I used was three frames to fade the bottom layer in, hold for four frames and a further three frames to return to the top layer.



13 Create a new composition called Lines to control the scan-line effect of the hologram. Import the supplied images Thin_Lines and Thick_Lines, arranging them on the timeline with the thick lines above the thin lines. Change the layer blending mode of the top layer to Add by hitting the Switches/Modes button to access the Layer Modes panel. Key the thick lines layer to slowly slide downwards.



14 Create a composition called Lindsey_Final. Drag Lindsey_Phased on to the timeline. On the layer above, drag the Lines composition. We'll use the luminosity values of the lines layer as an Alpha channel. Set the Layer Options view to Modes. Change the Alpha Options for Lindsey_Phased to Luma Matte Lines; After Effects hides the top layer and Lindsey will become transparent and lined.

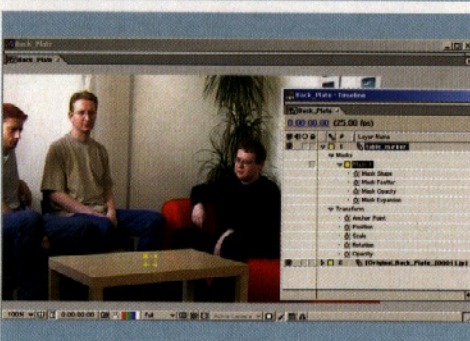


15 Currently the lines effect isn't being influenced by the distortion effect. This is because it's happening later on in the project hierarchy. If you're confident with the tutorial up to this point you might want to shift the lined effect further down the hierarchy by removing the Lines layer from Lindsey_Final and applying it to the two Lindsey_Key layers contained in the Lindsey_Graded composition.

STAGE THREE | Bringing it all together



16 Select the Lindsey_Final composition, and render it out as an uncompressed full-res AVI, making sure you include the Alpha channel. Go back to the Project window and reselect the Lindsey_Final composition. Right click and select Set Proxy > File. Find your rendered proxy file and click OK. Bingo! Proxy applied. This will alleviate some of the render demands After Effects makes on your PC.



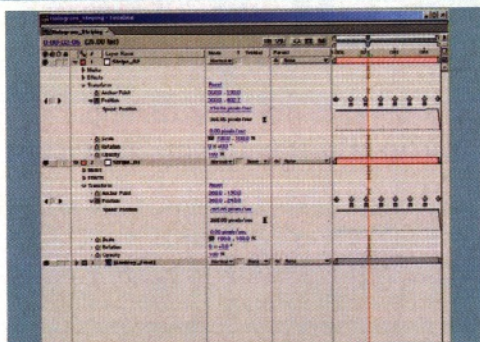
17 Create a new composition called Back_Plate. This composition will clean the background plate, removing the marker on the table. It's very simply achieved by using two layers, both containing the background footage. The top layer is offset and masked, so that we can use a small area of the table pixels to cover the marker on the bottom layer.



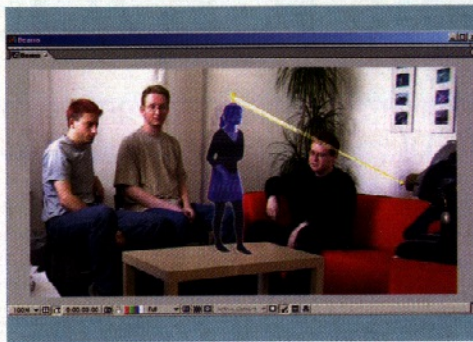
18 Create a new composition called Hologram_Stripping. Drag in the Lindsey_Final composition. Add a new adjustment layer. Add a Brightness/Contrast effect, boosting the brightness to 70. Create a new Additive mask and resize and position as shown above. Now animate the layer positioning so that the stripe oscillates up and down Lindsey, taking one second to complete each turn.



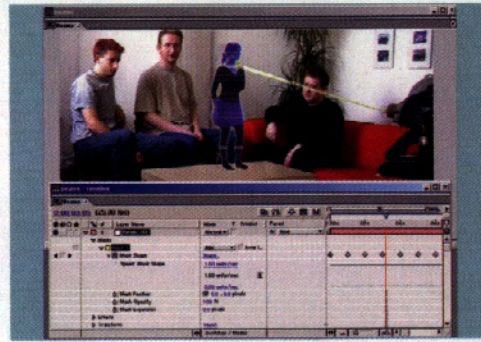
STAGE THREE (Continued) | Bringing it all together



19 You're animating the layer positioning because, by moving the layer and not keying the mask shape, you're free to adjust the width of the mask easily for subsequent tweaking. Once you're happy with the first stripe, duplicate the layer to create the second. Rearrange the position keyframes so that its oscillation mirrors that of the first stripe.



20 Now add the moving light beams. Make a new composition called Beams. Drag on the Back_Plate composition as the bottom layer and above it the Hologram_Stripping composition. Add a new adjustment layer with a Brightness/Contrast effect set to 70. Move to 4 secs. Create a new mask, this time with only three points. Set the feathering to 1 and arrange the mask as shown above.



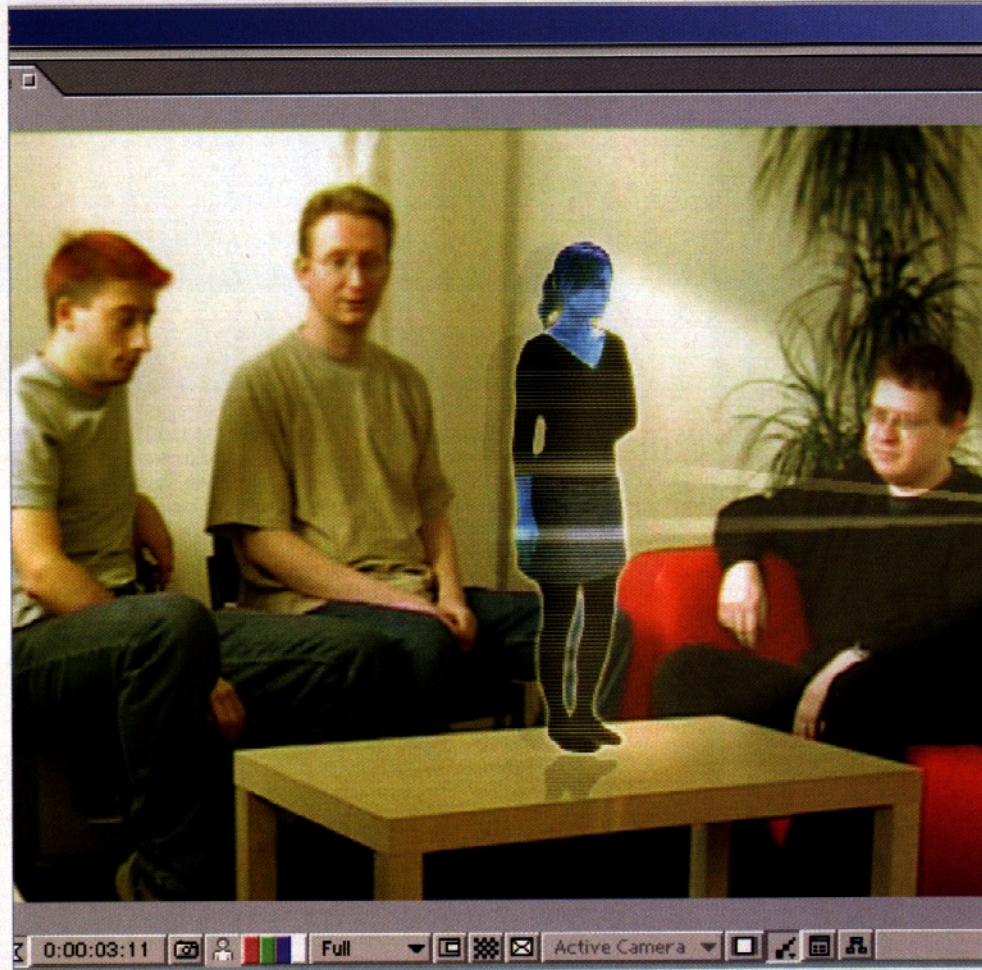
21 Now key the shape of the mask to follow the stripes. You're animating the Mask shape, not the layer position, because you're deforming the mask. Key the Mask shape here at 4 seconds. Move to 5 seconds and translate the two left-hand points down to match the stripe. You now have two Y values for the beam movement, so make it oscillate in time with the stripe.



22 Add one last mask to this layer. Make it an elliptical mask, with mode set to Intersect and a Feathering value of 100. Arrange it as shown. This gives the beam a gentle fall-off towards the end. Now duplicate the layer to create the second beam, rearranging the keyframes attached to the Mask shape values to reverse the motion.



23 Now add the glow radiating from the projector. To do this you're going to use an Adjustment layer and some animated masking. Apply a Brightness/Contrast effect to the Adjustment layer and boost the brightness by about 50. Add a mask, give it a Feathering value of 20, and arrange it as shown. Animate the mask to follow Lindsey as she stands up.



24 The last composition you're going to use in this project will enable you to change the final look of the shot. I've used the Curves filter to suck some of the blue out of the image and also to boost the red and green channels. Create a new composition called Final_Grade. Drag the Beams composition on to the timeline and have a bit of a mess around, experimenting with as much of the After Effects

toolset as you can until you end up with something you're happy with. You can do lots of things to make this project your own: adjust the colours and the contrast, or isolate and bloom the highlights. You can also adjust the hue or saturation, and try to make it as weird and funky as you like. And remember, if you strike After Effects down, it shall become more powerful than you can possibly imagine... ●

Q&A

Our experts this month...

3DS MAX

Pete Draper finds that natural camera shake is best achieved by an excessive dose of caffeine (or lack thereof) www.xenomorphix.co.uk

ANIMATION:MASTER

Shaun Freeman has taught *Animation: Master* to senior secondary students and is currently a freelance 3D artist www.shaunfreeman.com

CINEMA 4D

Adam Watkins is the director of Computer Graphic Arts at the University of the Incarnate Word in San Antonio, Texas www.cgaiuw.com

HOUDINI

Ben Schrijvers is one of the few Dutch *Houdini* users and is an FX animator at Framestore CFC in London, UK www.xs4all.nl/~benschi/cgfu/

MAYA

Gary Noden works at 422 Manchester in the north of England, where he's recently taken to swashing his buckle www.422manchester.co.uk

MOD0

Nicholas Oliger has worked as an animator on many game titles and is now a freelance demo artist for Luxology www.luxology.com

PHOTOSHOP

Leigh van der Byl is a South African-born 3D artist living in California. Her recent credits include *Sin City* and *The Aviator* <http://leigh.cgcommunity.com>

VUE 5 INFINITE

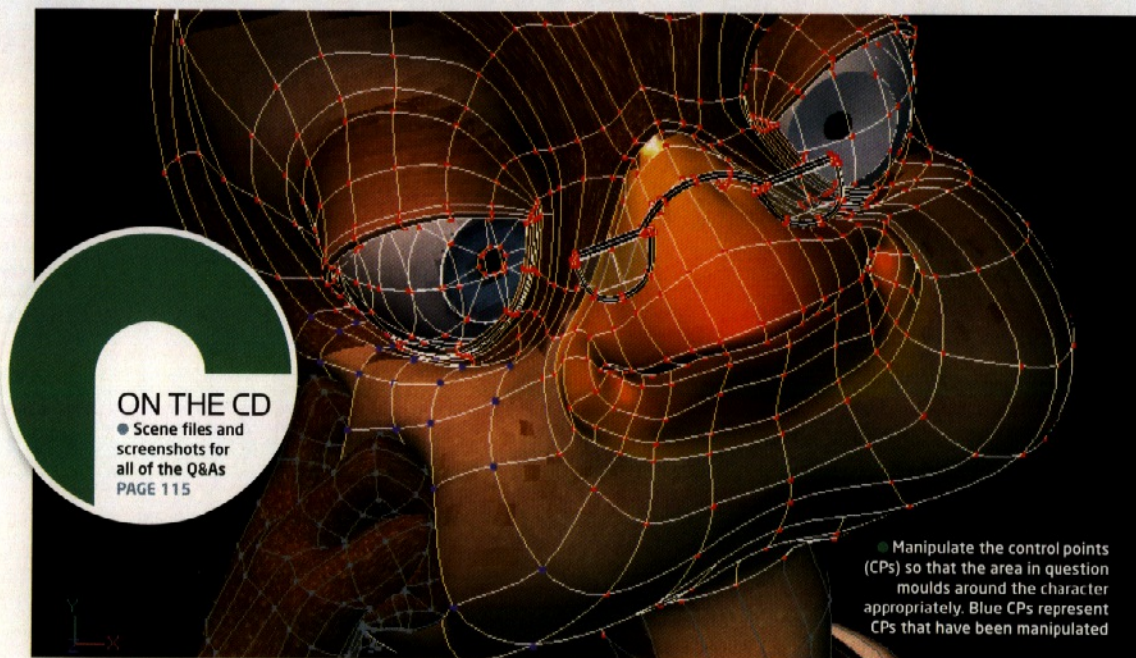
Eran Dinur is a 3D artist and animator. He's created sample scenes for *Vue 4*, *Vue 4 Pro*, *Vue 5 Esprit* and *Vue 5 Infinite* www.e-onsoftware.com

XSI

Ola Madsen works as a 3D artist for a company in Sweden, animating everything from medical treatments to furry teddy bears www.digitalcontext.se

Quick Questions

No matter which 3D software package you use, our experts are here to help. Send us your query and we'll provide the solution: <http://forum.3dworldmag.com>



ANIMATION:MASTER | Simple muscle motion controls

Q I'm at the latter stages of my animation and am using Muscle mode to clean up deformations and generally tweak things. But I end up with a mess of channels to deal with. Any tips on how to get more control over muscle motion created in the choreography? **JOHN KEATES, FROM THE FORUMS**

A Animating using Muscle mode can be done directly into the choreography. However, altering or changing the animation of the CPs (control points) can be very fiddly if done like this. A more effective way of animating CPs directly in the choreography uses pose sliders. An example of a situation requiring direct CP animation in the choreography might be if a female character rests her head on her hand, causing her cheek to distort as her fingers push the cheek upwards and out of position.

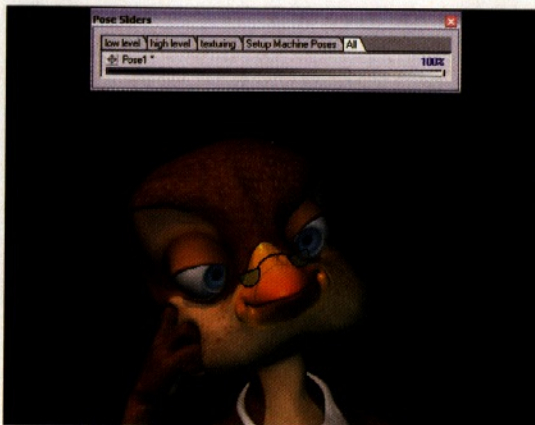
First, establish the pose with the character leaning her head in her hand. The hand can intersect the facial mesh, as CPs will be adjusted to mold to the hand later. Clicking on the Muscle mode option, the CPs are directly manipulated to distort around the hand appropriately. The adjusted CPs turn blue, indicating a keyframe has been created for them. Although this is done in the choreography, to animate the cheek area pushing down into the fingers causing this squishing effect would be quite complex if done by directly editing CP keyframes. The next step is to create a pose slider to control this process.

To create the pose slider, you should now select the area of the model, which has had the CPs altered. Press [Ctrl]+[C] to copy the CP keyframe data to the computer's clipboard. In the project workspace, right click on the model, select New > Pose > Percentage, to create a new Percentage pose. A relationship window will open. Ensure that the pose is at 100%, select the area containing the edited CPs, and press [Ctrl]+[V]. This pastes the CP keyframe data into the newly created pose.

The CPs associated with keyframes will now shift to their new position.

All you need to do now is to remove the initial CP keyframes created in the choreography. To do this, return to the Choreography window, select the area containing the edited CPs and, from the Edit menu, select Delete Keyframe.

This technique removes the process of having to animate individual control points, which would be frustratingly time consuming and tricky, and allows you to carry out quite complex muscle motion, which is then controlled by a single pose slider. **[SF]**

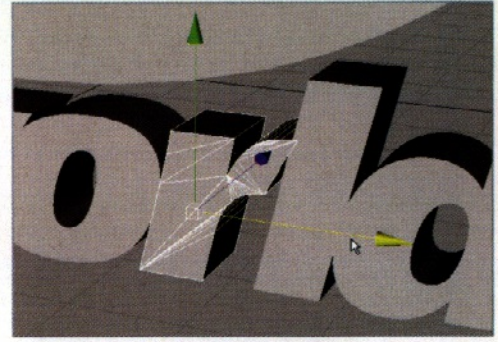
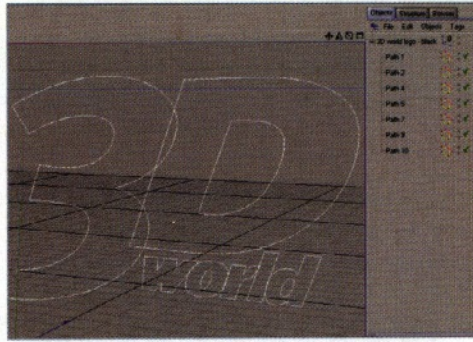


● The newly created Pose slider is really effective, as it can be used to manipulate the mesh in the choreography, so you don't have to worry about all the individual keyframes created by the CPs



CINEMA 4D | How do I get logo text from an Illustrator document into C4D?

STACEY, VIA THE FORUMS



01 Prepare in Illustrator
First, you need to make sure things are appropriately prepared in *Illustrator*. Select all your text and make it Outlines (Type > Create Outlines). Simplify the curves by combining any type shapes that overlap and are the same colour (unless they're to be animated separately). If shapes overlap, drag them apart before exporting. Use File > Export to export an *Illustrator* legacy file. Change the version setting to *Illustrator* 8.

02 Load exported file
In *C4D*, you can load the exported file by selecting either File > Open or, in the Objects manager, choosing File > Load Object. When you import the .ai file it will import a Null object with all the splines as its children. Check to see that 'holes' in letters really are holes and not separate splines. If they are, select the outer shape and the hole shape splines and select Functions > Connect.

03 Extrude each letter
For animation flexibility, extrude each letter or part of the logo separately. Place each spline in its own Extrude NURBS object. Label them so you don't get a load of unknown extruded splines. And finally, as you create the new Extrude NURBS shape, make sure you use the Object Axis tool to get the axis of rotation in an appropriate place in the centre of the extruded object. [AW]

MAYA | Faking a heat haze

Q Do you have any ideas on how to generate a heat haze in a scene? **ESCOOLER, FROM THE FORUMS**

A You want to do a heat haze using *Maya* and no compositing software? Good luck! It's not easy, as you need a compositing package to blend two renders in order to create the subtle distortion of rising hot air refraction. But you can do this in *Maya*, just in a very indirect way.

Animate your scene and then put particle-emitting tiles into your engine vents. Set them to emit multistreaks with a short lifespan. Turn the particle's colour accumulation on, and add a colorPP attribute using a Colour ramp from dark grey to black, adjusting it to avoid large patches of white in your renders. Give them a small amount of reversed gravity to simulate hot air

THIS IS POSSIBLE IN
IN MAYA, JUST IN A
VERY INDIRECT WAY

rising. Now turn off the particles and render out a Colour pass. Turn the particles back on, set the render engine to Hardware, turn on Enable Geometry Mask in the Render Globals, save the animation under a new particle type name, and render again.

Create a new scene with the same resolution settings as before. Create a NURBS or polygon plane and point it at a locked camera, making sure it fits exactly to the camera's resolution gate. Turn off the default light setting in the Render Globals. Open the Hypershade. Create a Lambert shader, assign it to your plane, and connect your pre-rendered Colour pass as an animating file texture to its Incandescence. Now create a blendColors and connect its outColour.R into the Incandescence file's place2dtexture node offsetU using the Connection editor. In the blendColor's blender, connect your particle pass render, setting it as an animating texture too. Set its filtering to Gaussian and then set the filter to about 3. Set both colours in blendColors to black, and bring up value of colour1 by a tiny amount. The value of this colour will add itself to the Texture placement of your colour pass, and distorts it as a result. [GN]



Q&ATIP

● This UV distortion technique can be really useful for creating smoke and also for faking certain displacements such as the sandstorm-face in the film *The Mummy*

● Think of your particles as a UV Bump map: the more variation there is between black and white, the better the resulting distortion will look. Here's an example of the composite, along with a visual guide to the shader created, with some colour added to the incandescence

MODO | Workflow in modo

Q I'm having trouble understanding Action centers and the Tool pipe. They just seem weird to me, and I'm not sure how to use them in my modelling workflow. Can you help?

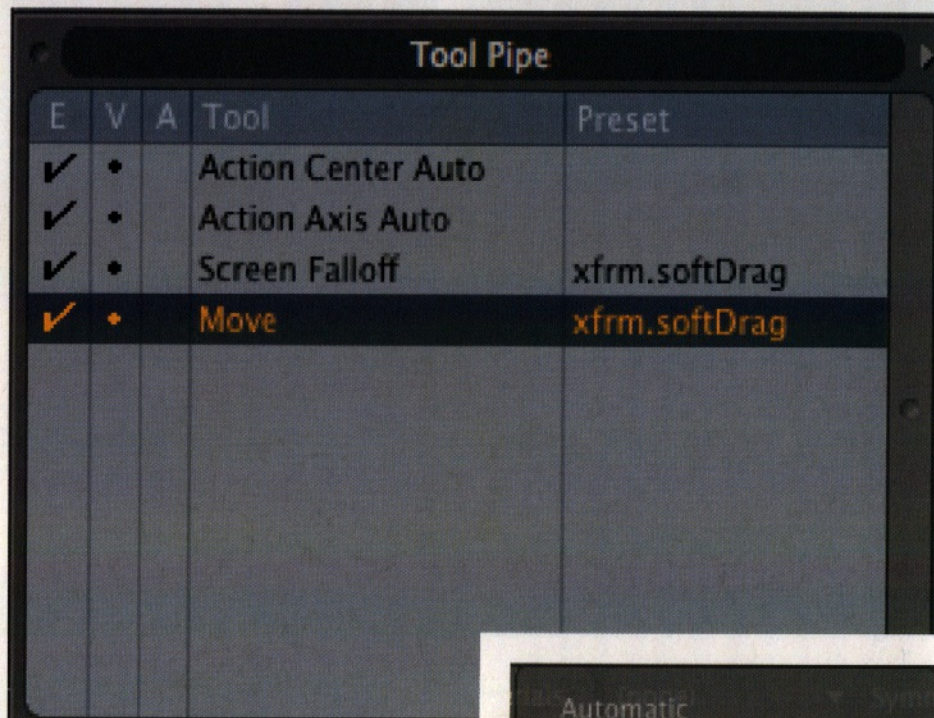
KORI, VIA THE FORUMS

A I was recently doing a demo of *modo* at the Game Developers Conference and this question came up several times. It's an important query because understanding how these aspects work together is fundamental to your comprehension of *modo*. Tools in 3D space need both an axis centre and an axis defined before they can perform their function. *modo* offers eight Action centers to choose from; each one offers a different method of defining this information for the tool. The default Action center in *modo* is automatic. In this mode, once a selection is made and a Transform tool is invoked, the handle will centre on the selection and align to the World axis. If you needed to align a certain piece of geometry to another, this mode would not be ideal. Instead, you should use the Selection mode, where the centre and the axis will align to whatever piece of geometry you choose, making it the right mode for your task. With *modo*, it's not about learning how to use a programmer's notion of how things should work, but rather deciding for yourself how you'd like to work.

Before I move on to the second part of Kori's question, I'll quickly address falloffs in *modo*, as they play an important role in understanding the tool pipe. *modo* offers eight falloff modes, which basically feed information to the current tool to determine which vertices are affected by the tool and by how much. The combination of Action center, falloffs and tools is done in the Tool pipe.

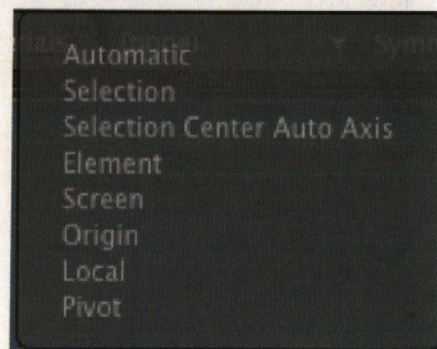
The Tool pipe allows the user to compose tools with various Action centers and falloffs, enabling them to create custom tools. An example of this would be the Soft Drag tool in the Deform tab. When you activate this tool, you'll see (in the Tool pipe) that this is actually the Move tool, combined with a screen falloff using an automatic Action center (see the screenshot on the right).

To summarise, the Tool pipe allows for extreme flexibility within *modo*, and provides the 3D artist with the ability to compose new tools by combining these elements - pretty handy. [NO]



• *modo*'s Tool pipe lets users compose tools with various Action centers and falloffs, effectively letting them create custom tools

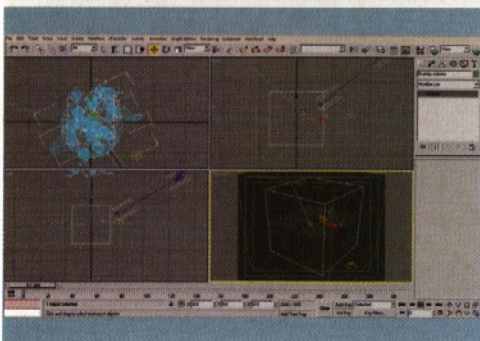
• *modo* offers eight Action centers to choose from, each offering a different method of defining this information for the tool



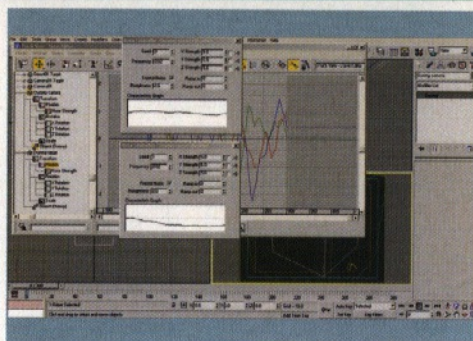
WITH MODO, IT'S ALL ABOUT DECIDING HOW YOU'D LIKE TO WORK

3DS MAX | How can I get a more realistic handheld-camera animation in 3ds max?

GORDON JAMES, VIA EMAIL



01 Open scene files
Open the cameramotion_start.max file from the CD. Here we have a basic dynamics setup to follow with our camera, which is already included in the scene. Add a Dummy object to the scene, and label it 'Dummy Camera'. Create another one and label it 'Dummy Camera Target'. Next, add the random motion to the dummies to link the camera and camera target objects too.



02 Function Curve editor
Open Function Curve editor and navigate to the Dummy object's Position Transform controller. Replace the existing controller with a Noise controller. Reduce the intensity by setting the X, Y and Z strength to 5 and frequency to 0.02. Right click the controller, and select Copy. Paste into the Dummy Camera Target's Position controller. In this new Noise controller, set the Speed to 1.



03 Link camera and target
At frame 0, link the camera and target to their respective Dummy objects. Play the animation to test. You need to animate the position of the camera target to focus on the scene. A good way is to reframe every 10 or 20 frames. Additionally, try animating the camera lens size to quickly zoom in and out of the scene - a fast zoom in (or out) over five or ten frames gives a nice result. [PD]



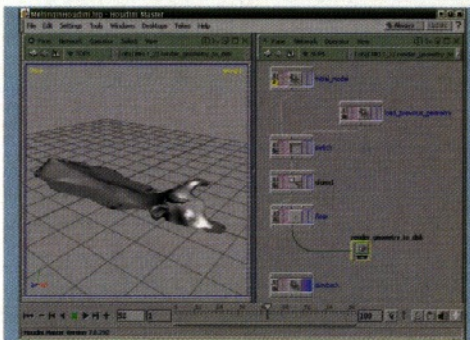
HOUDINI | How can I deform and animate a model like it's melting?

JOËL EINHORN, VIA EMAIL



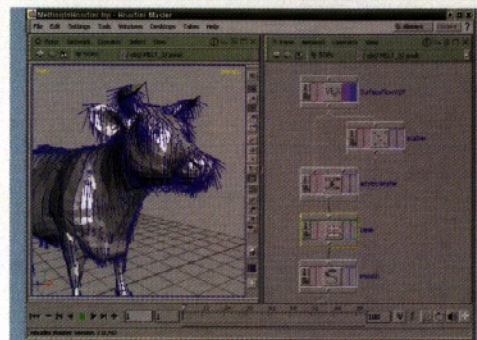
01 Create a directory

Melting needs a method you could call a feedback loop. Each frame, you deform geometry, save it to disk and load that file back in again next frame. Create a directory on a disk in which to save those files. Open the melting.hip file from the CD. Hit [Alt]+[A] to open the variable window, change MELT_DIR to the directory.



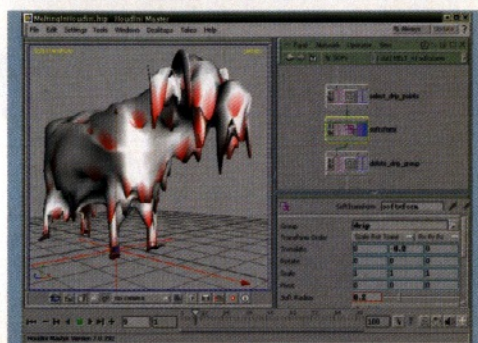
02 The basic feedback loop

Enter the object MELT_2. Select the ROP Output node and hit Render. After rendering, hit Play. Although the xform node's values are constant, the nature of the feedback loop means that this constant transformation is applied to the geometry every frame - which creates the animation. Click MMB on each node to read extra comments.



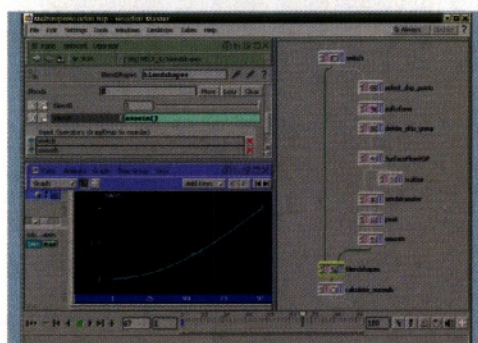
03 Flow along the surface

Replace the xform with a SurfaceFlowVOP node to calculate custom normals. Append a Scatter and AttributeTransfer the normals back onto the model. This will blur N in 3D. Append a Peak by 0.1, append a Smooth node and connect it to the floor node. We only need one smooth iteration as the feedback iterates already. Hit Render.



04 Adding some dripping shapes

To add drips, insert some more nodes inside the loop. Create a points group with the expression $\text{rand}(\$PT + \text{int}(\$F/5)) > 0.95$. This selects five per cent of the points and changes seed every five frames. SoftTransform the group down by -0.2. Append a Group to delete the point group. The group will be created again next frame.



05 Controlling the animation

To make the effect less linear we need to animate the amount of deformation. Add a blendShapes to blend between the Switch and Smooth. Keyframe the blend1 parameter to go from 0 to 1 and change the curve to a easein(). To compensate the slow start, Peak and SoftTransform need to be 3x stronger.



Q&A TIP

Use a feedback loop for effects that can't be reversed: for example, growing, erosion, breaking, bleeding, footsteps and so on

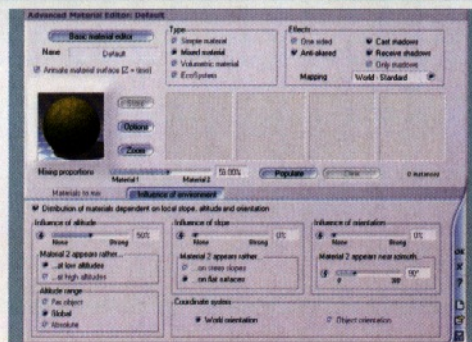
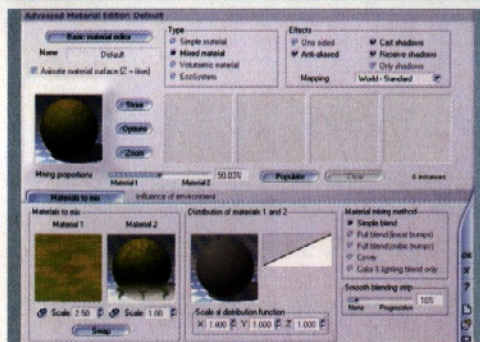
06 Creating a Melt Operator

This will give you a basic idea of how to do melting in Houdini. There's more that can be done to refine the effect so feel free to add more operators in the loop if you want to. I used a cow for a bit of a laugh, but you can apply this effect to any model you like. Just make sure the model you do use has enough detail to work with. A really

cool feature in Houdini is that you can collapse the network you just created above into a new custom operator. It took me about ten minutes to create this so-called Houdini Digital Asset and it's used in MELT_6. All the relevant parameters to control the melting are now together in one interface. So next time you need a melting effect, just use the Custom Melt node. [BS]

VUE 5 INFINITE | How can I use an EcoSystem to scatter trees just along riverbanks?

MICHAEL M, VIA EMAIL



01 Load the scene file
Load the river_start scene file. Select the terrain, and open the Material editor. Switch to Mixed Material mode. For material 1, load Fields from this issue's CD. For material 2, load Riverbank_trees. This is a simple EcoSystem material with maple and plum trees. Click Populate, and notice how the EcoSystem covers the whole terrain with trees.

02 Use altitude influence
To scatter the trees along only the riverbanks, switch to the Influence of Altitude tab, and set material 2 to appear at low altitudes (50%). Set influence of slope to 0%, and mixing proportions to 58%. Switch back to the Materials to Mix tab, raise the Smooth Blending strip to 42%, and click the populate button.

03 Add colour variations
Now add some colour variations to the EcoSystem, by modulating a Colour map with a noise function. In the Material editor, Double click on Material 2. Select the Colour tab, and turn on variable colour. Double click on the Colour swatch, and load Eco_colors from the accompanying CD. Double click on the function swatch, and load Eco_noise. Click OK, then click the populate button to see the result. [ED]

PHOTOSHOP | Alpha channels in textures

Q Can you tell me how you utilise Alpha channels in textures to blend different texture images together on a model? FELIX WILKINSON, VIA EMAIL

A Alpha channels are additional channels imbedded in images that allow for transparency information. Using an Alpha channel you can essentially tell a piece of software to ignore parts of the image. They work in shades of grey, with white areas of the channel being 100% opaque, black areas treated as transparent, and any grey areas treated as semi-transparent.

Using Alpha channels is, therefore, an easy and effective way of letting you tell your 3D software to ignore parts of texture images that are applied to the surfaces of 3D objects. This technique can be used with any 3D application and works for textures that are applied in standard UVW projections, as well as UV unwrapped textures. However, in order for it to be effective, the different areas that have separate images applied

ALPHA CHANNELS MAKE TEXTURING EASY AND EFFECTIVE

to them should overlap by a few polygons, as these overlapping areas will be where the blend takes place.

To start, create an Alpha channel in *Photoshop*, by going to the Channels palette, and selecting Channel > New Channel. By default, newly created Alpha channels are black. Bearing in mind that the white areas of the Alpha channel are the areas that the 3D image will regard as solid, fill the Alpha with white, and then feather off the edges using a black brush with a soft edge. When applied to a model as a texture, this area will fade to transparent, so that if this particular texture is layered over another one, the edges will fade off to reveal the underlying texture, as demonstrated in the image to the right.

When using this technique with more detailed UV maps, make sure you create your Alpha fade-off along the actual seams of the UV map itself, as opposed to the edges of the actual image. [LVB]

● The image applied as a texture on top of a checkerboard pattern. This demonstrates how the Alpha channel fades the texture at its edges



Q&A TIP

● Make sure you use varying shades of grey in your Alpha channel, instead of plain black and white, to avoid really hard transitions

● The image and its alpha channel. The black edges will cause the texture to fade to 0% opacity when applied as a texture





SOFTIMAGE XSI | Separating different deformations

Q I'm trying to model a phone cord, but the geometry gets all twisted. How do you go about creating one in XSI?

MARK ANDERSON, VIA EMAIL

A While the phone cord itself isn't necessarily that complicated, it does show how crucial it is to plan through the modelling phase before pulling and pushing points around in 3D space. If the deformations are applied incorrectly, you'll run the risk of getting unwanted distortions in your geometry, or worse: not achieving the desired result at all.

Start by drawing a rippling CV curve in the top viewport, with a length of about 25 units. This will form the general shape for the cord, so whenever you want to change (or animate) the

PHONE CABLES SHOW HOW CRUCIAL IT IS TO PLAN YOUR PROJECTS

flow of the cord, this is the place to do it. To establish the twist for the cord, you'll need a separate object. From the Primitive > Curve menu, click Spiral and set the height to 20 units. The radius should remain the same throughout the length, so set both the Start and End radius to 1. You'll need many more twirls than the default settings, so increase the End Angle to 9,000 (adding up to 25 loops) and change the Subdivisions to 100 to smooth the curve. Any additional effects or modification should be applied to this object.

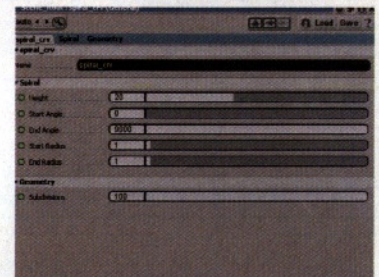
Finally, create the actual profile of the cord. In the top viewport, draw an oval-shaped CV Curve and from the Modify > Curve, click Open/Close to close the curve. With the curve still selected, click Create > Poly.Mesh > Extrusion Along Curve and pick the Spiral curve. Change the Subdivision Type to Absolute and increase the V abs to 200. Select the Spiral and click Modify > Deform > By Curve. Pick the path curve and change the deformation Axis to Z-axis. Select the profile curve again and rotate it along the Y-axis to make it align with the cord. Press [+] to subdivide the mesh, making it smoother. **[OM]**



Q&ATIP

● If you're to modify and/or animate the twirl effect (or its spacing) it's important that these deformations are evaluated before you deform the Spiral along the curve you're using as the path

● Your success in creating this phone cable relies on your deformations being evaluated in the right order



● Using separate objects for your deformations ensures that each will be evaluated in the order and manner you wish

CONUNDRUM | Send us your solutions to this month's brainteaser

Each issue, we set you a real-world 3D problem to solve. The sender of the best solution will win selected training resources. Our conundrum for last month was posed by *Cinema 4D R9* user Dimitrios Christou, who contacted *3D World* to ask:

"I'm trying to animate blood flowing down a wall for a horror scene. How can I make it move realistically? I thought that using metaballs might solve the problem, but found the resulting scene almost impossible to animate. I don't have Thinking Particles and am now trying to make my standard emitters do the work."

As with many things *Cinema*-related, forum regular Dr. Monkeyface came up trumps: "Ignoring the trail that the blood would leave on the wall, the particle solution is as follows. Create a Polygon object and place one point in it at 0,0,0. Next, create an emitter and a Metaball object. Drop the Single-point object into the emitter and drop that into the Metaball object. Create a Gravity object. Scale it up to fill the area and add a Deflector. I created a simple Plane object as a wall, then created a Deflector object and scaled it to the same size as the wall. Change the elasticity setting to 0% or the particles will bounce when they hit the wall. Place the emitter facing the wall and just in front of it.

When you start the emitter, the particles appear right in front of the deflector and, thanks to the Gravity object, slide down the face of the deflector. If the wall and deflector are in the same place, the Metaball object will be appear to be sliced in half. By adjusting the gravity, you can control the rate at which the 'blood' flows; by increasing or decreasing the metaball hull, you can change the density of the liquid."

The full solution, including the emitter settings, can be found in the *Cinema 4D* section of the forum, along with Dr. Monkeyface's second solution: a more controllable method using morph targets. Congratulations to the good doctor: a prize is in the post.

THIS MONTH'S QUESTION

Our conundrum for Issue 66 is posed by Mal Kennedy, who contacted *3D World* to ask:

"I want to imitate that 'globe' logo you have at the top of the pages in your magazine. But how do I create that 'liquid glass' look? I'm using *Softimage XSI*."

As ever, you can post your solutions on the threads in either the General Discussion or software specific sections of the forum. Good luck!



● Gravity, a deflector and metaballs are the key to creating flowing blood with standard *Cinema 4D* particle emitters. Full solutions can be found on our forum



Training resources on offer!

Post your solutions to the conundrum on our forum, and the one we think is best will earn its author a selection of 3D training resources...

Forum | Post your answers at <http://forum.3dworldmag.com>

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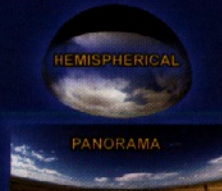
PALM TREES



55 Alpha Map Palms
plus:
- Plants
- Shrubs
- Flowers
- Hedges
- Branches & Leaves

TROPICAL TREES & FOLIAGE
Alpha Maps

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ST 5
Downtown
& Signs



ST 8
Absolute
Metals



ST 11
Oriental
Textures



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ST 6
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Architectural



ST 9
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Fabrics



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Sci-Fi**



**Home
& Office
Furniture
Models**



**Suburban
House
Models**

Coming up | NEXT ISSUE



IN ISSUE #67

HEAR US ROAR - 21 JUNE 2005



REVIEWS

HARDWARE / SOFTWARE / BUYERS' GUIDE



● On test this issue
(clockwise from top right):
rockdirect Xtreme Ti,
Alienware MJ-12m, Sony
VAIO VGN-A397XP, Dell M70,
HP Compaq NX8220



3D portables

GROUP TEST Being on the move doesn't mean having to compromise productivity. With these portables, you can take your work with you

BY MAT BROOMFIELD

Whether you have a long journey to work, or you often find yourself away from the office, or just you need to present to clients at their premises, a portable computer expands your horizons.

These days, portables have divided into two general categories: laptops, and mobile desktops. Laptops are small and light enough to carry in a bag – they're ideal for working on trains and planes. However, they generally sacrifice performance for portability. They'll usually run using reduced power components, such as the Centrino-based Pentium M processor family, and they'll have smaller screens. Mobile desktops, on the other hand, provide superior performance. They're usually too large and heavy to carry around by hand for much distance, and their battery life is generally too short for any serious amount of work. But they do include desktop processors and large, high-resolution screens.

This issue, we've assembled five machines we think will be suited to the 3D professional. Some fit neatly into one of the

categories mentioned above. Others are hybrids, offering excellent performance in some areas, and retaining complete portability.

When selecting a portable computer for 3D use, there are a number of key elements to consider: the most important of which are the processor (CPU) and graphics chip (GPU). The weighting you give to each of these depends upon your intended use. The GPU is important because it enables the display of your DirectX or OpenGL 3D scene. Without a GPU, the CPU is responsible both for calculating the content of your scenes, and creating the display. Not only does this burden the CPU, but so-called software rendering is

slower and can't cope with sophisticated effects such as shaders.

Lesser considerations will be the amount and speed of the memory, and the size, resolution and quality of the screen display. All our suppliers use DDR2 memory, which is twice the price of its predecessor. As a result, some only include half a megabyte in order to keep costs down. With lots of ports for adding additional devices, all are expandable, enabling you to increase their functionality if required. So let's see how you can increase your productivity...

IF YOU HAVE A LONG JOURNEY, A PORTABLE EXPANDS YOUR HORIZONS

TALKING POINT | Improving the display

LCD MANUFACTURERS HAVE recently taken a step forwards in display technology. Sony's X-Black system increases contrast and, using a special coated laminate, distributes light more evenly across the surface of the panel to eliminate the areas of colour variance that have frustrated graphics professionals, who require excellent colour purity.

Other manufacturers have attempted to walk in Sony's footsteps, and the Alienware machine has a version called Clearview. This appears to be a simpler version of X-Black – a coated glass laminate is fused to the screen. This increases contrast and colour clarity, but reduces the viewing angle, and makes the screen more sensitive to bright lighting within the room.



DETAILS

PRICE
£3,106 / \$5,902* / €4,544*
*Currency conversion
(All prices include VAT)

PLATFORM
Windows

MAIN FEATURES
• Pentium M processor 770
• Nvidia Quadro FX Go1400
GPU with 256MB RAM
• Hi-res 15.4-inch screen

MANUFACTURER
Dell

WEBSITE
www.dell.co.uk



Dell M70

When money is no object, there aren't many more powerful 3D laptops than the Dell M70



ew people need blistering 3D performance on the move, but if you're one of those people who needs

to work away from mains power for extended periods of time, there's no better option than the M70.

At the heart of the system is an Nvidia Quadro FX Go1400 GPU. This is the fastest mobile processor that we've encountered in a long time, exceeding (by at least 200 per cent) the Open GL performance of the Radeon X600 and X800, and the Go 6800. The DirectX numbers aren't quite so formidable, illustrating perhaps a lack of driver optimisation in what Nvidia considers a secondary API for the 3D professional.

The M70 uses a Pentium M processor 770. This is currently the fastest mobile processor available, by which we mean it's intended specifically for the mobile user, unlike the Pentium 4 – which is found in the Alienware and rockdirect systems. Its performance is slightly below a 3GHz desktop Pentium 4 (as found in the rockdirect Xtreme).

This machine has every possible enhancement to ensure optimum performance. Although it only has a

15.4 inch widescreen, it runs at a hugely impressive native resolution of 1920x1200 and, just like its competitors, it can support a second monitor. With 2GB of fast DDR2 memory, you won't find your RAM acting as a bottleneck either.

The system only includes a 60GB hard drive, which is a potential limitation. Worse still, it doesn't have a FireWire port, so you're limited to adding any external storage you might want to use via the USB ports.

Although others have faster CPUs, if 3D performance is a primary consideration to you, they simply don't come any better than this system, and it has enough power optimisations to provide a quoted battery life in excess of three hours.

VERDICT

PROS

- Powerful 3D
- Superlative warranty
- Excellent battery life

CONS

- Expensive
- Small hard drive

RANGE OF FEATURES	8
VALUE FOR MONEY	7
OVERALL	8

DETAILS

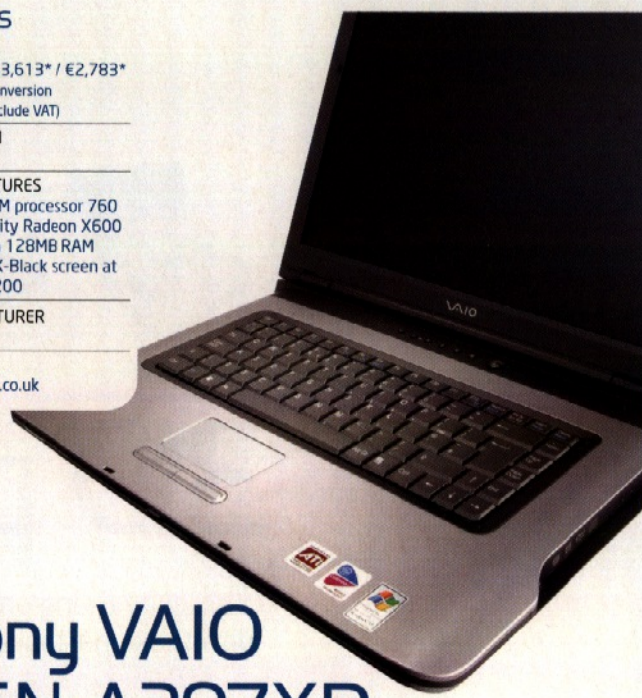
PRICE
£1,902 / \$3,613* / €2,783*
*Currency conversion
(All prices include VAT)

PLATFORM
Windows

MAIN FEATURES
• Pentium M processor 760
• ATI Mobility Radeon X600
GPU with 128MB RAM
• 17-inch X-Black screen at
1920x1200

MANUFACTURER
Sony

WEBSITE
www.sony.co.uk



Sony VAIO VGN-A397XP

You know you're going to get great style with Sony, but what else can this system provide?



ou don't pay as much for the Sony brand as you used to, but it still commands investment.

This is the only one of the three 17-inch systems that uses a mobile processor, and that appears to be why it can claim a battery life of almost two hours – in spite of its extra-bright 'X-Black' screen. Of course when a portable operates on batteries, screen brightness diminishes, as does CPU and GPU performance. The whole point of the Pentium M's Centrino technology is maximisation of battery life, not optimisation of performance.

This system uses a Pentium M processor 760, placing it joint last with the HP model in terms of CPU performance. It also uses an ATI Radeon X600 processor like the HP machine – maybe it was the choice of motherboard, or the installed drivers, but the version in the Sony VAIO seemed less stable than the HP chip. It failed to complete two of the OpenGL tests and where it did finish, it offered generally decent performance, albeit worse than the supposedly identical HP processor. Its DirectX performance was less impressive, which

surprised us, given the fact that ATI tends to achieve good performance in this area. The VAIO's 17-inch screen runs at a 1920x1200 resolution but the system only comes with 512MB of RAM.

Following Sony's trend for supporting its own technology, in addition to its Type I and II PCMCIA slot, the VAIO also has room for a Memory stick. This makes it an ideal companion for a digital photographer using a Sony camera or camcorder. The machine is lighter and more compact than the other two 17-inch models, but it's still larger than we'd want to take on trains and buses.

Overall, the system is elegant to use and look at, but it falls short in the performance stakes.

VERDICT

PROS

- Stylish
- High-resolution screen

CONS

- Expensive
- Relatively slow CPU
- Inadequate memory

RANGE OF FEATURES	6
VALUE FOR MONEY	6
OVERALL	6



DETAILS

PRICE
£1,643 / \$3,120* / €2,403*
*Currency conversion
(All prices include VAT)

PLATFORM
Windows

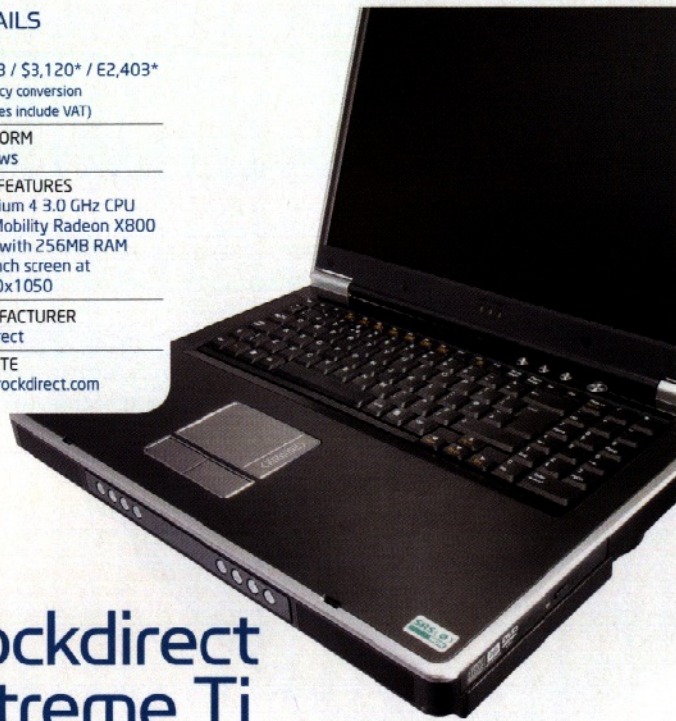
MAIN FEATURES
• Pentium 4 3.0 GHz CPU
• ATI Mobility Radeon X800
GPU with 256MB RAM
• 17-inch screen at
1680x1050

MANUFACTURER
rockdirect

WEBSITE
www.rockdirect.com

rockdirect Xtreme Ti

If you're on a budget, rockdirect's generous three-year warranty avoids nasty expenses down the line



DETAILS

PRICE
£1,526 / \$2,899* / €2,233*
*Currency conversion
(All prices include VAT)

PLATFORM
Windows

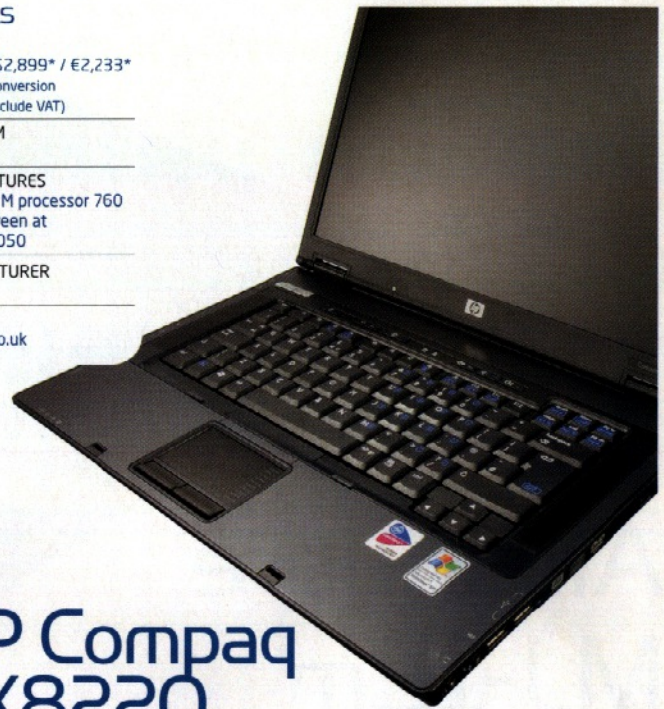
MAIN FEATURES
• Pentium M processor 760
• 15.4" screen at
1680x1050

MANUFACTURER
HP

WEBSITE
www.hp.co.uk

HP Compaq NX8220

When you want laptop portability at an affordable price, HP has a solution that fits the bill



Many small companies need to plan their expenditure months or even years in advance, so an unexpected expense such as replacement or repair of a laptop can be disastrous. With its three-year collect and return warranty, the Xtreme Ti is one portable that won't be springing any surprises on you.

It uses the same chassis as the Alienware machine, although the lid is a brushed metal one, rather than the MJ-12m's contoured plastic. It features a Pentium 4 running at 3GHz, which provides it with the second-best performance in this round-up. The Xtreme's Radeon X800 GPU provided the best DirectX performance, exceeding the nearest rival by more than 30 per cent. If you regularly work with Microsoft's High Level Shader Language, then it's an ideal partner for you.

Although ATI claims that this gaming GPU is the fastest in the world, its OpenGL performance was performing well in some areas and not in others, so you'll need to consider this aspect on an application-by-application basis. While the Xtreme may share the same housing as

the MJ-12m, everything within is customisable. It also has a nicer, less reflective screen, albeit one that runs at a 1680x1050 resolution. It's odd in a system with such a relatively small drive, that it should include a RAID controller. This can be used to improve performance in a dual drive system.

The Xtreme Ti seems to be suffering from a personality disorder. It can't decide if it's a workstation or a games machine. We feel it's a workstation wannabe – with a paltry 512MB of memory, and a 56GB hard drive, the Xtreme Ti is targeted at games users. Don't let that put you off – the system is scalable, and you can always bump the specs up to something suited to your creative needs.

VERDICT

PROS
• Powerful
• Great DirectX performance
• Large screen

CONS
• Small hard drive
• Inadequate memory

RANGE OF FEATURES	8
VALUE FOR MONEY	7
OVERALL	7

Although 15.4 inches is the smallest screen in our group test, you should remember that many people are still using smaller displays on their desktop. Like all its group rivals, the NX8220 uses a widescreen aspect ratio, which makes the display appear smaller than one with a conventional 4:3 ratio. Nevertheless, with a resolution of 1680x1050, there's more than enough space for you to be highly productive.

On paper, the machine's Radeon X600 GPU comes out the worst in the test, but this wasn't borne out by the benchmarks, with the machine coming in at around halfway up the table. Like the Sony machine, it scored well in some OpenGL tests, and poorly in others. One area where it did play to form though was its DirectX throughput: it came last, with a poor 3DMark 2005 rating of 945. This has it coming in below even the Sony system, which uses the same chip. To a certain extent, we had hoped that ATI's workstation DirectX driver optimisations might have been applied to the laptop too, but, unfortunately, that seems not to be the case.

The CPU is also the same as the Sony's – a Pentium M processor 760. This is a system designed for use away from a power supply, so the Centrino savings are perhaps the most meaningful with this system – every part is optimised to maximise battery life. It's strange then that HP won't quote an expected battery life for the computer.

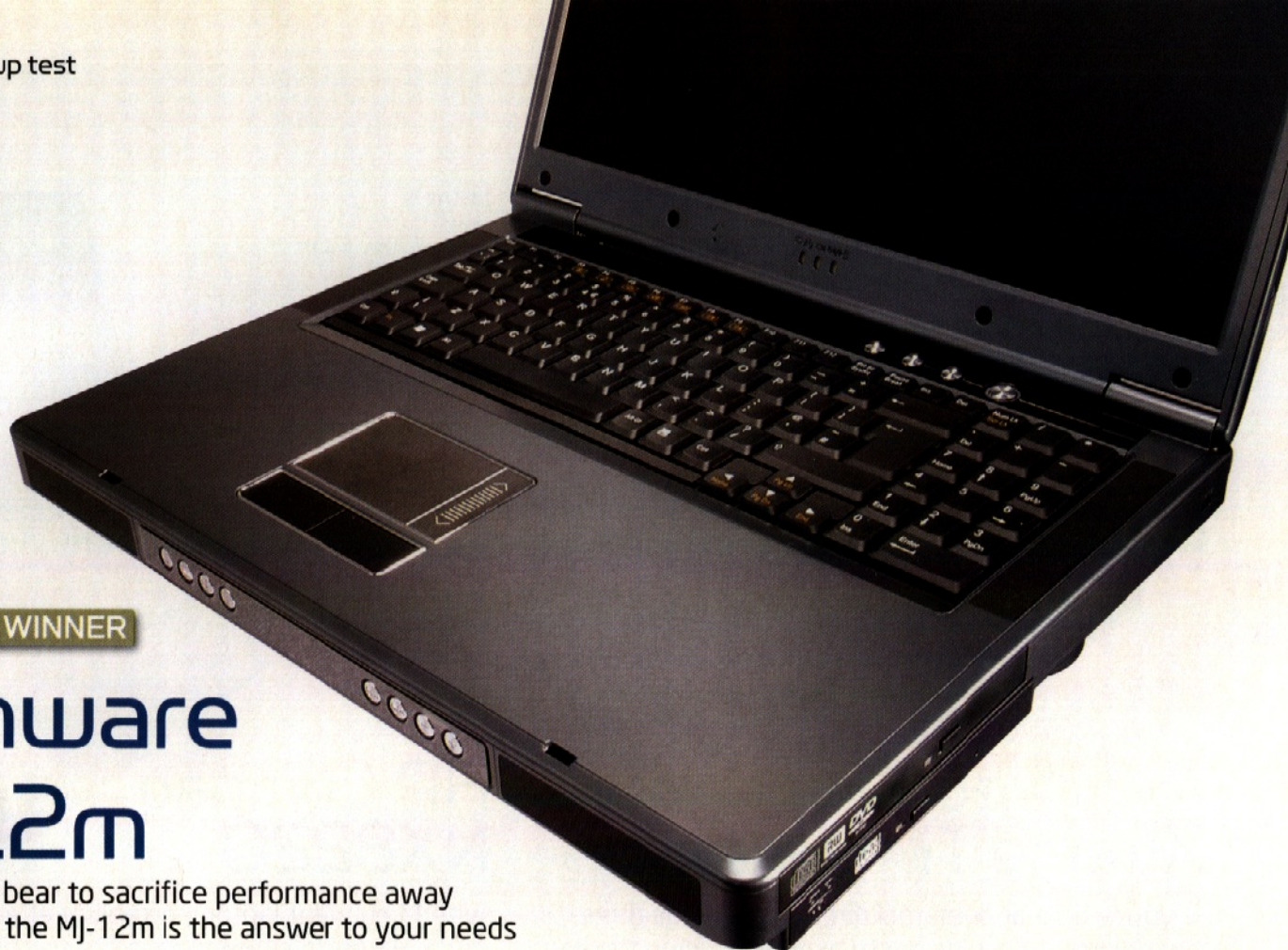
At 2.8kg, this slimline machine is the most compact and portable in our test, and easily fits into one compartment of a small briefcase. In spite of that, it includes an 80GB hard drive and 1GB DDR2 RAM – the competition could learn from HP's example. This is an elegant laptop and, provided you don't need optimum performance, it will serve you well.

VERDICT

PROS
• Small and light
• Good screen resolution
• Inexpensive

CONS
• Relatively slow CPU

RANGE OF FEATURES	7
VALUE FOR MONEY	8
OVERALL	7



THIS ISSUE'S WINNER

Alienware MJ-12m

When you can't bear to sacrifice performance away from the office, the MJ-12m is the answer to your needs

DETAILS

PRICE

• £1,849 / \$3,519* / €2,715*

*Currency conversion
(All prices include VAT)

PLATFORM

Windows

MAIN FEATURES

- 3.4 GHz Pentium 4 processor
- 1GB DDR2 RAM
- 100GB HD
- Nvidia GeForce Go 6800 GPU with 256MB RAM
- 17-inch screen
- 1680x1050 resolution
- DVD-RW & DVD-ROM
- WiFi & Ethernet
- 7-in-1 media card port

MANUFACTURER

Alienware

WEBSITE

www.alienware.co.uk



et's get one thing clear from the start – at a little under six kilograms, the MJ-12m is definitely not a laptop. It's portable, but if you had to lug it more than a couple of hundred yards, you'd probably need to visit a chiropractor's afterwards. Alienware describes it as a mobile desktop, which is to say that it provides an all-in-one solution that can easily be transported from place to place. It's not a machine that you whip out of your bag with a flourish on a crowded commuter train...

However, there are many benefits to such a large, heavy chassis. The most important is the fact that it enables the manufacturer to install a decent processor. This model uses a full desktop version of the 3.4GHz Pentium 4. This provides at least 10 per cent more performance than the fastest Pentium M processor and, in real terms, probably much more. It lacks the cutting-edge power economy, and low-heat operation of true mobile processors, and that means the computer has very high power consumption – typically lasting about an hour on a fresh battery. But as we've already pointed out, this is not a machine designed for battery operation – it's meant to enable you to

take your office computer with you anywhere you go.

The other important element is the GPU, and this system uses an Nvidia GeForce Go 6800. Nvidia describes this as an "enthusiast processor," which is to say that it's targeted at serious game players,

Clearview high-contrast screen surface too reflective for our tastes, reducing the optimum viewing angle. The review model comes with 1GB of DDR2 memory – we would have preferred 2GB, but this type of fast memory is expensive. Another unique benefit with this system is the fact that it

A TERRIFIC SYSTEM THAT BALANCES PERFORMANCE IN ALL AREAS WITH AFFORDABILITY AND STYLE

rather than 3D professionals. Nevertheless, this doesn't make it bad; it simply lacks the optimisations and certifications that the most demanding professionals may require – but then, if you're that demanding, maybe you shouldn't consider a portable.

The 6800 comes second only to rockdirect's Radeon X800 in terms of DirectX performance, even beating the extremely expensive Dell M70. When it comes to OpenGL benchmarks, it's about halfway up the league table, just losing out to HP's Radeon X600.

With a 17-inch widescreen display, offering a native resolution of 1680x1050, the MJ-12m offers plenty of work space, although we found the shiny

includes both a DVD-ROM drive and a separate DVD writer, making it useful for multimedia duplication.

The MJ-12m is a terrific system that balances performance in all areas with affordability and style.

VERDICT

PROS

- Inexpensive
- Versatile
- Balanced power

CONS

- Heavy
- Short battery life

RANGE OF FEATURES
VALUE FOR MONEY
OVERALL

10
9
9

SADLY, IF YOU'RE DESPERATE FOR POWER, NO LAPTOP CAN COME CLOSE TO MATCHING THE PERFORMANCE OF A HIGH-END DESKTOP SYSTEM

CONCLUSION | Which portable is right for you?

The scores we awarded were based on a composite of features, rather than any single element. We asked ourselves, "Why would a professional 3D user want a laptop?" Although we came up with many answers, in most situations blistering performance was secondary to functionality - if you're desperate for a powerful computer, no laptop can come close to matching the performance of a state-of-the-art desktop system.

No, we presumed that, for the most part, you require a means to run the same software as in your office, at other locations. You appreciate that there'll inevitably be some performance sacrifices, so you need a machine that provides a working environment that feels as similar to your desktop machine as possible. That means that the machine will need to be versatile, enabling it to meet needs that you envisage

now, and those that simply arise along the way. Each laptop had something to commend it. Great 3D performance is always a bonus, and it's only relatively recently that portables can offer remotely decent capabilities in this area. However, while great 3D improves the ergonomics of your working environment, raw CPU power has a considerably greater impact, improving the productivity of every task that you perform.

The Dell system, of course, provides blistering 3D performance, but at the cost of CPU performance. However, its long battery life is appealing. It's the sort of machine you'd assemble if money were no object. But, of course, it is. That brings us to the HP system, at the opposite end of the financial scale. It's wonderfully compact considering its screen size, and it's certainly versatile, but it just lacks a bit of oomph in every key performance area.

That leaves the three 17-inch models. We immediately discounted the Sony because it's underpowered, and its OpenGL performance was unstable. Its high-quality, high-resolution screen is appealing, however.

The rockdirect system was very tempting, but we felt that too many important economies had been made to meet the price tag.

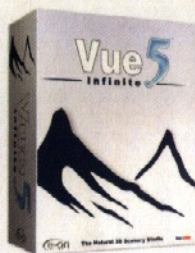
Looking at the Alienware computer, we felt that the company had gone out of its way to anticipate our needs, providing a system that was designed with maximum versatility in mind. It feels as though the MJ-12m is a portable that we can use for just about everything we might want to do, now and in the near future. It's not quite as powerful as a true desktop, and it's certainly bulky, but the MJ-12m will enable you to be productive wherever you find yourself.

PERFORMANCE COMPARISON (HIGHER SCORES BETTER)

MODEL	3DSMAX-03	CATIA-01	ENSIGHT-01	LIGHT-07	MAYA-01	PROE-03	SW-01	UGS-04	3D MARK	SANDRA DHRYSTONE MIPS	SANDRA WHETSTONE FPU/ SSE2 MFL0PS
HP Compaq NX8220	10.55	11.78	8.590	10.02	16.89	14.10	10.03	10.99	945	8143	2744/3547
rockdirect Xtreme TI	8.582	7.227	12.73	9.001	12.80	8.651	7.215	wouldn't run	3737	8761	3619/6210
Alienware MJ-12m	10.83	6.958	6.858	7.093	15.23	8.576	7.344	3.780	2649	9419	4041/6354
Sony VAIO VGN-A397XP	10.12	10.80	wouldn't run	11.23	6.52	11.80	8.610	wouldn't run	1260	8165	2748/3543
Dell M70	23.59	16.77	18.70	16.01	33.15	38.36	20.07	24.88	2369	8697	2927/3781

FEATURES

MODEL	PROCESSOR	SCREEN SIZE	RESOLUTION	GRAPHICS CHIP	GRAPHICS MEMORY	HARD DRIVE	RAM	CD/DVD	NETWORK	WEIGHT	WARRANTY	PRICE	SCORE
HP Compaq NX8220	Pentium M processor 760	15.4" widescreen	1680x1050	ATI Mobility Radeon X600	128MB	80GB	1GB DDR2	DVD+/RW	WiFi, GBit Ethernet	2.8kg	One year standard parts and labour	£1,526 inc VAT	7
rockdirect Xtreme TI	3GHz Pentium 4	17" widescreen	1680x1050	ATI Mobility Radeon X800	256MB	56GB (formatted)	512MB DDR2	8X DVD-RW	Bluetooth WiFi, GBit Ethernet	5.5kg	Three year collect and return	£1,543 inc VAT	7
Alienware MJ-12m	3.4 GHz Pentium 4	17" widescreen	1680x1050	Nvidia GeForce Go 6800	256MB	100GB	1GB DDR2	8x DVD-RW 10/24 DVD-ROM	WiFi, GBit Ethernet	5.6kg	One year return to base	£1,849 inc VAT	9
Sony VAIO VGN-A397XP	Pentium M processor 760	17" X-Black widescreen	1920x1200	ATI Mobility Radeon X600	128MB	80GB	512MB DDR2	DVD+/RW	Bluetooth WiFi, GBit Ethernet	3.9kg	One year return to base	£1,902 inc VAT	6
Dell M70	Pentium M processor 770	15.4" widescreen	1920x1200	Nvidia Quadro FX Go 1400	256MB	60GB	2GB DDR 2	DVD+/RW	Bluetooth WiFi, GBit Ethernet	3.23kg	Three year next working day	£3,106 inc VAT	8



DETAILS

PRICE

- Full product £411 / \$599 / €599
- Upgrade from Vue 4 Pro: £136 / \$199 / €199

PLATFORM

PC / Mac

MINIMUM SYSTEM

PC

- Windows 2000 / XP
- Pentium III
- 512MB RAM
- 100MB HD

Mac

- OS X 10.3
- G4
- 512MB RAM
- 100MB HD

MAIN FEATURES

- Landscape generation and animation
- Includes hundreds of preset scenes and objects
- Supports billions of polygons
- EcoSystems enable automatic generation and conditional distribution of objects
- Many rendering enhancements
- Includes HDRI lighting
- Extensive compatibility with third-party 3D programs
- Supports camera synchronisation with the majority of 3D apps
- Render individual channels or save as a G-Buffer
- Support for animated *Poser* figures
- Advanced procedural material generator
- Easily edit procedural terrains

DEVELOPER

e-on software

WEBSITE

www.e-onsoftware.com

RELATED PRODUCTS

- *Vue 5 Esprit*
Reviewed: Issue 59
- *Vue 5 Pro Studio*
Reviewed: Issue 65

Vue 5 Infinite

Vue may be terrific at creating visualisations and artwork, but can it hack it in the world of advertising and movie making?

BY MAT BROOMFIELD



-on software now has three channels to its *Vue* product line. In previous issues, we reviewed *Vue 5*

Esprit and *Vue 5 Pro Studio*, to which we can now add *Vue 5 Infinite*, the 'sequel' to *Vue 4 Professional*. The most powerful and expensive of the three, it is targeted at anyone involved in architectural visualisation, CG or professional film and video work.

This version introduces a vast swathe of new features designed to increase its usefulness as a landscape construction and animation tool. A number of these are technical back-end tools, such as import and export filters, greater compatibility with third-party programs, and a greater range of procedural functions. There are also new, advanced lighting modes to enable more realistic rendering. However, the feature of greatest interest is EcoSystems.

EcoSystems represents one of the greatest technological advances in 3D that we've seen in many a year. It enables you to comfortably populate your scenes with a vast number of polygons. We're not talking about hundreds of thousands here, or even millions, but rather *billions* of polygons. The most remarkable thing is that you don't pay a massive penalty in terms of the program's responsiveness or rendering time.

EcoSystems is essentially an object duplication and scattering technology. It can replicate thousands of instances of an object and distribute them throughout your



© Robert Czarny

● By using *Vue 5 Infinite's* EcoSystems functionality to both distribute and colour fields and houses, you can quickly create natural-looking towns and settlements, as in this image

chosen area, applying as much order or randomness as you require. Using simple parameters, it's easy to vary the scale, orientation and colour of the objects to create the impression of even greater variety. Furthermore, EcoSystems can comprise multiple objects, so one system may have bushes, grasses and trees.

Each object within EcoSystems can have its own distribution rules, so you might put dense grass on lowlands and assign the colours green, yellow and orange. You could then place shrubs sparsely on mid-level slopes. Finally, you might place rocks on only

high-altitude slopes with an angle of less than 30 degrees. The result is that you can build heavily populated, incredibly diverse and complex conditional environments, without having to manually place each object. Furthermore, as long as you use instances of a relatively small number of master objects, the program runs just as quickly as normal.

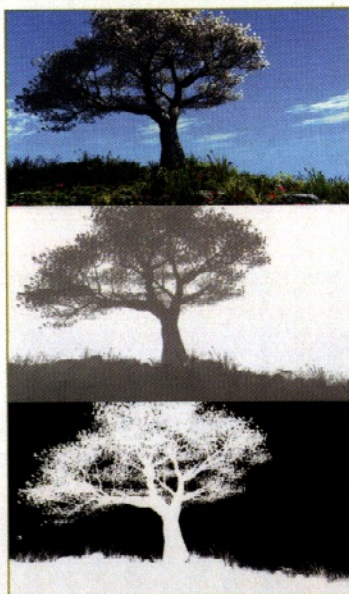
The great thing about EcoSystems is that they don't simply apply to plants and rocks. Want to do your own Clone Army? Simple. You just import a single robot with a walk cycle created in *Poser* and then use



● The new area render can automatically enlarge the selected area so you can check the fine detail, without changing the camera settings



● It's possible to import digital Height maps and apply aerial photos to recreate real scenes, although this isn't one of the program's strengths



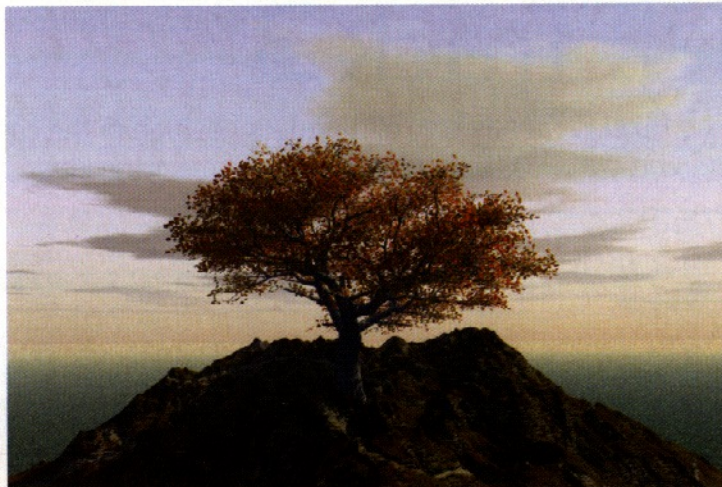
● Here's a Z-Buffer and an Alpha channel, but the program can save many more passes, such as highlights, illumination and shadows

EcoSystems to replicate an army of 5,000 soldiers all marching in time. You can even get them to follow a path so they march where you want. By using half a dozen or so separate soldiers, each with their own paths, you can create the appearance of crowd motion. Sadly, the system has yet to allow for proximity or collision detection, but having said that, you can still specify that Eco objects won't be placed so that they intersect other non-Eco objects – so you won't see scattered trees growing out of houses, or grass growing out of a character's head.

You can also specify the distribution of Eco objects using the Procedural Texture Editor – although this is, at times, ridiculously convoluted to use. In addition, you can use various types of Noise map to create random distribution, or you can import your own bitmaps to indicate precisely where you want objects distributed. As far as we are aware, there's nothing remotely like EcoSystems in any comparable piece of software.

IT'S UP TO VUE

The greatest limitation with EcoSystems is that they must be used within the program. You can export every other Vue scene element, including lighting, procedural textures, water, animation, atmospheres and more, but EcoSystems can't be exported. In fairness, you only have to think



● The program automatically assigns a breeze to all plants, although you can still generate directional wind forces to add custom atmospheric detail to your Vue 5 Infinite animations

for a nanosecond to see why – one sample scene has over 72 billion polygons, so even if you found another program capable of manipulating that many polygons, the scenes would be Terabytes in size.

This means that the emphasis for rendering is placed upon Vue, and it has a whole range of new features and enhancements to assist in this area. In addition to the global radiosity and Global Illumination lighting modes that were added in *Vue 5 Esprit*, *Infinite* now offers HDRI lighting, where an image is used as a light source for both the global lighting and atmospheres. Furthermore, the program

user can configure it to interact exactly as he or she requires. This is very much part of e-on's vision to present the program as a professional tool, capable of producing movie-grade animation. Now that the Python scripting has been further upgraded, along with the Procedural Editor (to say nothing of the awesome new EcoSystems technology), the program can finally compete with bespoke systems that, in the past, had to be custom written for individual CG studios.

There are still one or two glaring omissions, the greatest of which is the ability to handle water properly. *Vue 5 Infinite* can now do a very decent simulation of waves and surface turbulence in the open ocean, but

the water won't interact with objects in any way. Another omission is the current inability to import vector data for overlaying roads and boundaries.

The node-based procedural shader and EcoSystems designer are also obscure and would be complicated for anyone lacking a good understanding of mathematics. Yet for the most part, *Vue 5 Infinite* makes a very complicated process as simple as possible.

Vue continues to lead where others don't even dream to follow. Its interaction with other programs places it in its own league – it's inspirational and enjoyable to use. With effort, you can achieve close-up photorealism and, with some minor reservations, it could be used within the movie industry to create animated landscapes, spacescapes, underwater scenes and much more. ●



● The program easily produces impressive photorealistic results at distance, but it still takes a lot of tweaking when you're up close



● Not only can you edit and create your own plants, but they can also be exported for use with other software applications



● *Vue 5 Infinite* enables you to post-process your images, taking advantage of the program's 96-bit colour registers

VUE'S INTERACTION WITH OTHER PROGRAMS PLACES IT IN ITS OWN LEAGUE – IT'S INSPIRATIONAL

VERDICT

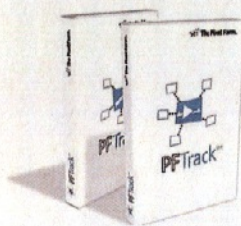
PROS

- Incredibly versatile
- Quick to get started
- Extensive manual

CONS

- Still no proper water dynamics
- EcoSystems must be rendered within the program

RANGE OF FEATURES	8
VALUE FOR MONEY	9
OVERALL	8



DETAILS

PRICE

- Full version £3,000 / \$5,000 / €4,500
- Upgrade from *PFmatch* £2,400 / €4,000 / €3,600

PLATFORM

PC / Mac / Linux

MINIMUM SYSTEM

PC

- Windows XP
 - 1GHz Pentium
 - 512MB RAM
- MAC
- Mac OS 10.3.8+
 - 750MHz G4 (G5 recommended)
 - 512MB RAM
- Linux
- Most Linux OSs
 - 512MB RAM

MAIN FEATURES

- Fast, powerful 3D tracking
- Supports 3D geometry imports for matching to footage
- Can track multiple objects, in addition to camera, from single sequence
- Integrated image-modelling functionality
- Automatic Z-depth extraction; provides per-pixel depth data for export as grey map
- Fully editable F-curves with graphical display of camera parameters for re-solves
- Optical flow analysis and editing offers a per-pixel tracking and camera meta-data resource

DEVELOPER

The Pixel Farm Ltd

WEBSITE

www.thepixelfarm.co.uk

RELATED PRODUCTS

- *MatchMover Pro 3.1*
Reviewed: Issue 63
- *boujou 3*
Reviewed: Issue 64

PFTrack 3

The Pixel Farm has consolidated its position in the camera-tracking market with version 3 of PFTrack - now sporting object tracking

BY MARTIN SOUTHWOOD



Formed in 2002, UK-based software developer The Pixel Farm has made great strides in the post-production landscape. Yet while its two previous releases of its core app, the high-end tracking and data analysis product, *PFTrack*, have presented great improvements (such as optical flow analysis), both were marred by the conspicuous lack of an object-tracking facility. Now on version three, *PFTrack* finally sports object tracking, geometry import and model tracking, automatic Z-depth extraction and image-based modelling functions, transforming the application into an even more comprehensive suite of solutions to supplement the high-end tracking core,

Though big, this upgrade remains lean, with no gimmicky baggage. Instead, it provides for a greater number of useful routines to be undertaken from within a single application, faster and more easily. This ease of use is an important element of the software's appeal: The Pixel Farm's development ideas originate from people who actually work in the post-production industry - those poor souls who are saddled with the task of fulfilling the ambitious dreams of film directors and producers, and who are therefore pushing existing technology to always do that little bit more. *PFTrack 3* will make their jobs easier, and the price has stayed the same, too.

To understand *PFTrack 3*'s new innovations, we need to place the software in its proper context. When *PFTrack* was



● *PFTrack* can now use 3D geometry, such as this preconstructed model, for tracking, instead of only 2D tracking points. The model is tweaked keyframe to keyframe until it matches the moving footage precisely - an ideal feature for projects involving face or head substitution work

launched just two years ago, the camera tracking (matchmoving) market was dominated by a handful of products: *boujou*, from pioneer developer 2d3, *MatchMover* from RealViz, and Science.D.Visions' *3D-Equalizer*. From the outset, *PFTrack* had several characteristics to enable it to compete on its own terms, despite its cheaper price. These were a deceptively simple interface; the ability to integrate itself into a working environment through its cross-platform data management system, like a kind of network rendering solution; and the powerful tracking algorithms at its core. Each upgrade has

expanded the practical use of the data generated, which is why version 2 included optical flow technology, capable of per-pixel tracking and data analysis, and advanced motion-capture functions.

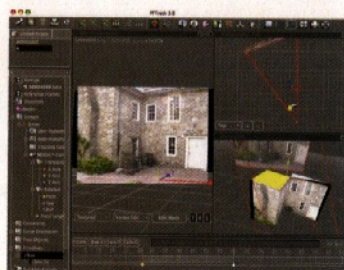
INDEPENDENCE DAY

Artists working in 3D and compositing have always wanted something that could track independently moving objects, as well as the camera, from the same shot. This is a solution the main developers have forever been saying was 'in development'. While necessity has provided workarounds, a dedicated object-tracking function has always been both a Holy Grail and a glaring omission from most apps. While Andersson Technologies' *SynthEyes* does allow object tracking, its relative complexity and limited automation has rendered this an esoteric, enthusiast's option.

Last year, too, saw industry favourite *3D-Equalizer* introduce object tracking with its Point Group feature. But *PFTrack 3* takes this on a stage by including not only object tracking, but also geometry tracking, automatic Z-depth extraction, integrated image-based modelling capabilities and fully editable F-curves. Utilising data obtained



● New Z-depth extraction tools assign depth data, for export as a grey map. *PFTrack* also lets you view a 3D model of this data, and now can further help orientate your scene with a new orthographic viewer option



● *PFTrack 3*'s new geometry import allows a cube matched to the known geometry of a building to facilitate a quick solve. An accurate model of the scene is created, which can then be used to extend a set in perfect scale



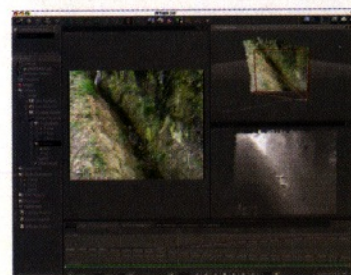
● Aided by data from the camera track and a new orthographic view feature, greater accuracy is possible in orientating and quickly building a 3D model of a scene while using native textures from the footage: this proves to be a very useful pre-visualisation facility

from tracking in these ways, and within the application that originally produced the data might seem a logical extension of the technology, yet *PFTrack* and, to an extent, *3D-Equalizer* presently stand alone in realising this goal.

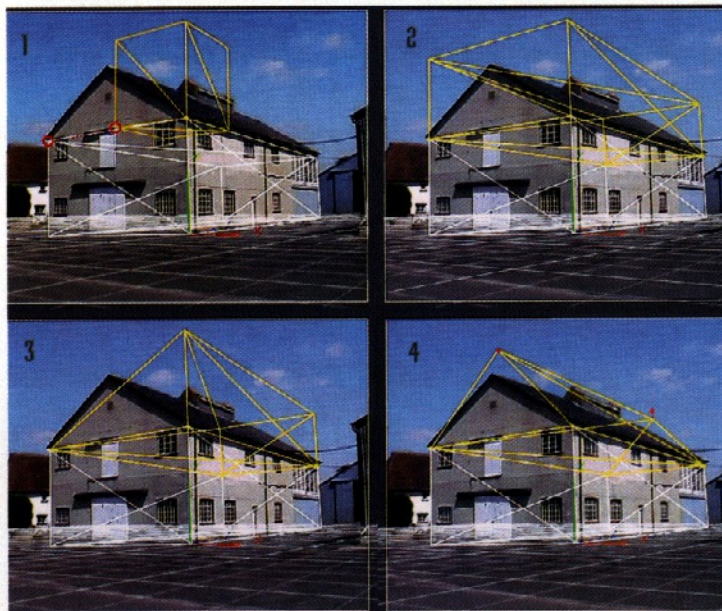
AN OBJECT LESSON

Traditional tracking applications require that an object moving independently of the camera within a scene is matted out, so as not to distract the algorithms from the principal movement – that of the camera. With *PFTrack 3*, once the camera has been solved, it's now possible to invert the matte, exposing only the moving object. This can then be automatically tracked and solved in the usual way – a real time saver. In practice, the object is identified as a motion group within the same shot and appears as such in the shot's Overview panel. Your tracked object can then be oriented according to the camera motion in the usual way, though you'll notice that it appears with a bounding box. This represents the object orientation. By selecting the object group's name, it can then be oriented independently of the camera motion. This is a useful function for tasks such as head or face changes.

The export options also enable you to individually select whichever tracking group you require, and in this latest version can be accompanied by Z-depth data as a grey



● By tiling the viewing windows, the original footage can be visually examined for quality next to its 3D model and subsequent depth gradations as a grey map, as in this example



● It's now possible to quickly build accurately scaled models based on background plates. Easy-to-use tools allow a basic primitive to be deformed to match detail from the plate below

map. This is automatically extracted, though at present only on a frame-by-frame basis, and not as a complete sequence.

PFTrack's unique geometry tracking features are another of those 'what would be really useful is...' innovations. If you have a 3D model to match up with live footage, haven't you ever thought how handy it would be if you could just lay it over your footage and match it along with the camera track for the footage, thereby killing two birds with one stone?

PFTrack 3 now enables you to do this, although it doesn't support the import of animated models. Once you've imported your .obj file into *PFTrack*, translate, scale and rotate tools help you make an initial match. For especially tricky shots, you can attach a vertex to a pixel in the footage and track and manipulate on a frame-by-frame basis, with each of your changes marked as a keyframe. In addition, if your footage contains some known geometric forms such as buildings, you can import simple geometry, fine-tune the alignment to the object (building) using simple click controls, then use this as the basis for your solve, a method which results in some extremely accurate results.

The new image-based modelling features mean that you are now able to utilise your footage, along with its 3D data, to quickly and accurately create 3D models which use the background plate and all its specific 3D characteristics as a guide. This turns your tracking application into a powerful pre-visualisation or animation

planning facility – tasks normally associated with separate, standalone applications. Additionally, *PFTrack* now provides a sophisticated toolset to enable you to reconstruct imported geometry to perfectly match elements within your footage. Using native resolution, textures can be extracted and mapped to authentically render the finished models.

This upgrade is so substantial that it feels like a totally new application. Even

PFTRACK 3'S DEGREE OF EXTRA FUNCTIONALITY FEELS NATURAL, LIKE IT SHOULD BE THERE

without mentioning the numerous little enhancements to its interface layout and design, the degree of extra functionality feels natural: like it *should* be there. None of the additional elements give the impression that they've been bolted on in haste, instead integrating seamlessly.

Of course, it's not perfect. Image-buffer compression like that of *3D-Equalizer* should be available. Also, *PFTrack 3* still doesn't support the use of reference frames (still images), the Z-depth extraction is limited to a single frame, and as mentioned, the geometry import can't deal with animated models. Finally, it would be a nice luxury to see a quickly rendered movie of the camera track, like those other systems offer. Nonetheless, this is probably the most complete, and completely useful, film tracking system currently available. ●



● After matting out a moving object from the camera track, *PFTrack 3* enables you to invert the matte and independently track the moving object(s). In this instance a car. Each point group remains independent of the others

VERDICT

PROS

- Fast, powerful tracking facility
- Geometry and object tracking
- Automatic Z-depth extraction

CONS

- No animated model imports
- Only partially automated lens distortion correction

RANGE OF FEATURES

9

VALUE FOR MONEY

9

OVERALL

9



3ds max 7.5

Distributed bucket rendering, hair and fur, adaptive radiosity meshing – did Santa forget to drop some stuff off to max subscribers at Christmas?

BY PETE DRAPER

DETAILS

PRICE

- Free to subscription users
- Subscription costs £295 exc. VAT (\$440) and must be renewed yearly

PLATFORM

PC

MINIMUM SYSTEM

- Any system capable of running 3ds max 7

MAIN FEATURES

- Hair and Fur
- Use hair as emitters for instanced geometry
- *mental ray* update
- Adaptive radiosity
- Batch render
- Sweep modifier
- Scene State
- MR Satellite nodes for DBR
- Improved *mental ray* performance
- Autodesk *Revit* and *Inventor* import and file access

DEVELOPER

Autodesk

WEBSITE

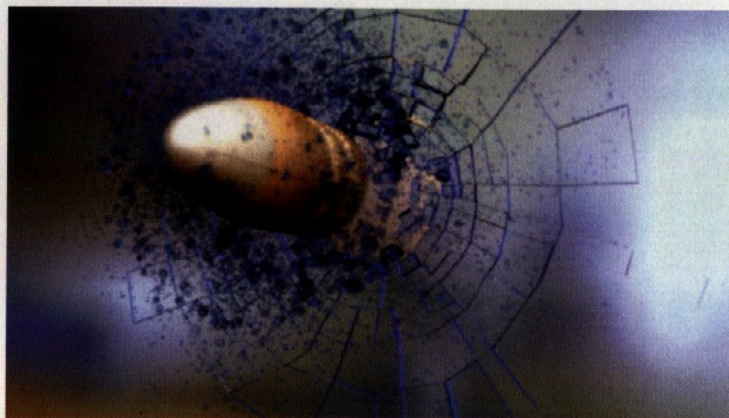
www.autodesk.com



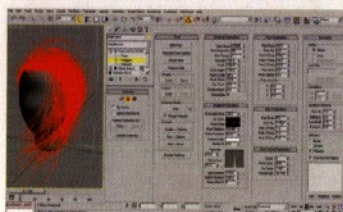
Things have been busy in the Autodesk camp of late, what with rebranding from Discreet to Autodesk Media and Entertainment, and releasing service pack updates and the Cloth extension for 3ds max 7. There's now also an update (of sorts) to the software, in the form of the new 7.5 extension, which is only available to subscription members. This included several improvements to existing tools and some new features that 3ds max users have been crying out for, chief among them Hair and Fur.

Originally based on Joe Alter's *Shave And a Haircut* plug-in, Hair and Fur can be found in several places in the software, including the main object type, where you have complete control over all aspects of the hair strands, clumps, shading, dynamics and so on; and in the Render Effects section, as the hair is by default a post effect, with the shadows being rendered in the initial scanline pass and the hair applied afterwards. Because some renderers don't like post effects, you also have the option to convert the hair to geometry and render it out in one go, but even on the most basic scenes this can seriously crank up the polygon count, resulting in massive render times. The feature set is impressive, however, particularly the wide range of controls for hair strand/clump shading and distribution.

3ds max 7.5 also provides access to Distributed Bucket Rendering (DBR) in *mental ray*, which enables you to render off a scene on up to eight slave CPUs on additional machines (accessed via an IP address) so the workload can be shared. This helps a lot, but the initial distribution can take a while to prepare, especially if



● The 3ds max 7.5 extension brings access to distributed bucket rendering in *mental ray*, a godsend when you're working with multiple-pass depth of field and motion blur in heavily raytraced scenes



● Although the Hair and Fur interface looks cluttered, it does serve as a central hub for full control over the hair's aesthetics



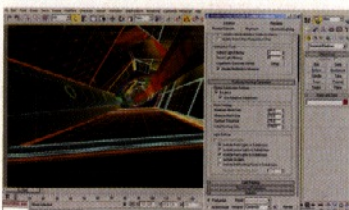
● Distributed bucket rendering enables you to use up to eight satellite CPUs on the same image, reducing rendering time considerably

you're working on a heavy scene. Even though you have access to eight machines, using every available CPU in your medium-sized farm isn't advisable, as it can be counter-productive; a single slower machine can make the render hang, and you'll have to wait for that bucket to finish.

The final addition is the inclusion of VIZ extensions, which are more geared to the architectural industry. Radiosity now has Adaptive Subdivision, which saves on scene data and can be more accurate around fine detailed areas. Scene State allows you to set up multiple lighting and camera positions which can then be saved with the main scene (without any heavy additional scene data) – perfect for tweaking lights for different scenarios, moods or lighting conditions. UVW mapping has also been improved to make it more accurate, and there's also the new Sweep modifier, which is simply a cheap version of Loft but which has some nice controls.

While the subscription system seems good value for money (and there's no doubt

it is, especially if you buy mid-cycle as you get any updates released during the 12-month cycle at no extra charge), the main flaw is that you have no way of knowing if the extensions are going to be relevant to your area of work. An animator isn't going to have much use for the VIZ extensions, for example. You're also going to be pretty annoyed if you've just gone out and bought *hair fx*. Overall, however, 3ds max 7.5 is a solid upgrade, particularly if you work in the architectural visualisation industry. ●



● Adaptive Subdivision has been introduced to the Radiosity advanced lighting system, reducing the need for meshing an entire object

RELATED PRODUCTS

- *Ormatrix* 1.1
Reviewed: Issue 64
- 3ds max 7
Reviewed: Issue 59

VERDICT

PROS

- Hair and Fur's ability to use instanced geometry
- DBR in *mental ray*
- Speed improvements with final gathering

CONS

- Hair's interface can be daunting
- Issues with DBR node lists

RANGE OF FEATURES
VALUE FOR MONEY
OVERALL

8
8
8



Surpasses

Work faster and manage your renders better than ever before with this superb new pass manager for LightWave

BY BENJAMIN SMITH



peculiarity of NewTek's *LightWave 3D* is that although the Modeler application has had a neat system of layers built in since the dawn of time, no one has ever had the presence of mind to build a similar system into Layout. In fact, navigating a complex scene remains quite challenging, even in the 8.2 release; you have to make some elaborate selections in the Scene Editor to show and hide scene elements in order to make a heavy scene workable.

Enter Lukasz Pazera, plug-in programmer extraordinaire, who will be familiar to many *LightWave* users thanks to his *Auto Character Setup* system. Pazera has deftly addressed the layers issue, and a host of other *LightWave* problems, with the release of *Surpasses*, a layer manager for Layout that goes far beyond merely being a scene organisation tool; it offers an entirely new way of interacting with *LightWave*.

Installing and setting up *Surpasses* is a little tricky, although it's all neatly packaged as a single executable that places a host of plug-ins into the appropriate folders in your *LightWave* install. An LScript then adds them to Layout and creates a neat *Surpasses* tab. This has a host of buttons, so major functions can be accessed easily.

USING SURPASSES

Adding *Surpasses* to a scene brings up the main *Surpasses* panel, from where you can add new passes, place scene elements into them and manage what the passes do. A simple use would be to place different scene elements in different passes so you could easily show and hide parts of the scene, exactly as you would in Modeler.



● *Surpasses* enables you to instantly switch between modes and views. For instance, you can swap from this Z-buffer render pass...



● Using *Surpasses* it takes just three seconds to place these robot objects in a separate layer...

However, passes can also give new visibility settings to objects. This means that a complex character rig with lots of objects could be switched from a low-res, wireframe with all animation controls visible to an uncluttered, nicely subdivided, smooth shaded display, all with a single click.

Not only that, but settings from *Surpasses* are renderable as well, so you can hide stuff from renders and give objects different render settings. Now you begin to get a glimpse of *Surpasses*' secret other life – as a tool for setting up render passes that can be used to drive a composite. Presets are even included, so common settings – such as making an object non-matting black, or forcing the whole scene to use white-on-black to fake a Z-buffer pass – can be applied in moments. You can switch between these settings in an instant, and at any time.

Surpasses governs scene properties (fog, render settings, plug-ins) as well, so you could use it to control your scene,



● ...to this handy sketch-like wireframe in an instant. The *Surpasses* panel also neatly rolls up into a mini-toolbox



● ...and then you can hide everything else with a single click to remove clutter from the scene

ignoring *LightWave*'s panels a lot of the time. Pretty soon, you're wondering how you ever managed without it.

There are a few teething troubles with the plug-in, however. For instance, some of the 'fixes' NewTek included in *LightWave 8.2* caused *Surpasses* to become temporarily broken until Pazera issued an update. However, *Surpasses* does an amazing job, given the limitations of *LightWave*'s plug-in architecture, and it's likely to become an essential part of any *LightWave* artist's toolbox. ●

VERDICT

PROS

- Boosts productivity
- Simple render pass setup
- Integrates well with FPrime

CONS

- Some teething troubles with *LightWave 8.2*
- Can be tricky to install

RANGE OF FEATURES 9
VALUE FOR MONEY 9
OVERALL 9

DETAILS

PRICE

- £58* / \$109* / €85
- *Currency conversion

PLATFORM

PC (an OS X version is currently in development)

MINIMUM SYSTEM

- Any system running *LightWave 7.5c* or higher

MAIN FEATURES

- Layer manager for *LightWave*
- Effortless layer setup and switching
- Pre-made presets for common settings
- Render pass manager
- Control object and scene settings
- Split scenes into render passes
- Efficient, well-designed UI
- Superb HTML documentation

DEVELOPER

Lukasz Pazera

WEBSITE

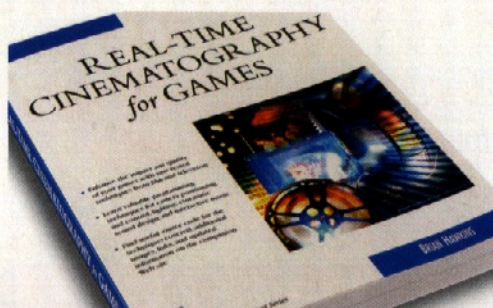
<http://sps.polas.net>

RELATED PRODUCTS

- FPrime
- Reviewed: Issue 51

DETAILS

AUTHOR
Brian Hawkins
PUBLISHER
Charles River Media
PRICE
£26* / \$50 / €39*
(*Currency conversion)
PAGES
326
ISBN
1-58450-308-4



Real-Time Cinematography for Games

Whenever we cover the topic of 3D and games converging, we find ourselves amazed all over again at the quality of real-time and pre-rendered game art, and with the new generation of consoles we're certain that we'll be blown away on a regular basis by so-called 'cinema-quality' work.

But cinematography – the narrative technique of the cinema – isn't just about detailed textures and powerful lighting. This book seems to be aimed at the game artist looking for a primer in film techniques, and while much of its content is a by-numbers

distillation of the basics of cinematography, the chapters covering the possibilities and limitations of applying cinematic techniques to games are where it delivers genuinely thought-provoking material.

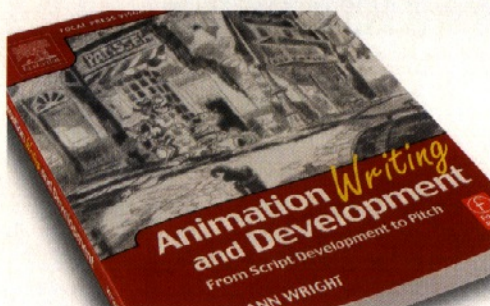
3D artists from all walks of life will find this book interesting, but whether working games artists will find enough in it to justify reading the whole thing is debatable. ●

VERDICT

Useful if you want a basic primer on how film techniques relate to games, but not very practical **7**

DETAILS

AUTHOR
Jean Ann Wright
PUBLISHER
Focal Press
PRICE
£17 / \$28 / €25*
(*Currency conversion)
PAGES
344
ISBN
0-240-80549-6



Animation Writing and Development

From Script Development to Pitch runs the subtitle – and this guide certainly covers all aspects of this process, and more.

The book goes far beyond the practical to include historical information and advice for pitching an idea and selling a script, and also takes into account social factors such as children's expectations and different interpretations of animated work. But here's where it falls down slightly; in trying to be so comprehensive it sometimes strays too far from its subject matter, and instead of remaining tight and lively, and delivering

targeted advice, padding begins to creep in; does an aspiring scriptwriter really need a chapter examining the basics of human development, for example, with revelations such as: '[Between ages 18 to 45] young adults are establishing new life patterns?'

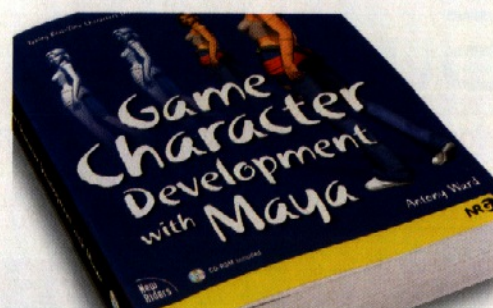
Overall, though, the style is friendly, and there are some genuinely useful chapters, so it's worth a dip if you're starting out. ●

VERDICT

A useful book if you're an animator who's never written a script before **8**

DETAILS

AUTHOR
Antony Ward
PUBLISHER
New Riders
PRICE
£40 / \$50 / €59*
(*Currency conversion)
PAGES
793
ISBN
0-7357-1438-X



Game Character Development with Maya

When you first struggle under this book's immense weight you can't help but wonder: has Antony Ward been possessed by the ghost of Leo Tolstoy?

Game Character Development would suggest that he has, at least when it comes to its sheer epic length. And if the book's size is off-putting, then its cover image doesn't exactly create a great first impression either; the girl character we're being shown how to model looks more like someone you'd see outside your local bar than inside a fantasy videogame.

At least the information is thorough enough, and you'd need to be a particularly low-watt bulb not to be able to follow the meticulously detailed examples. But at times you feel the book would have benefited from a ruthless pruning and a more judicious use of imagery – do we really need to see a pic of a LOD 5 character that appears as little more than a tiny speck? ●

VERDICT

A good detail-by-detail, linear guide, but not for competent game character designers **6**

DETAILS

AUTHOR
Daniel Wade (Ed)
PUBLISHER
Ballistic Publishing
PRICE
£18* / \$34* / €26*
(*Currency conversion)
PAGES
96
ISBN
1-921002-09-3



CG Challenge: Machineflesh

Machineflesh is a product from Ballistic Publishing, the venerable institution that runs the industry's favourite discussion forum, CGTalk. The forum's various themed CG Challenges regularly yield a crop of amateur to professional-level 3D art.

Machineflesh features the best work from one of these contests, and outside of the small group of people whose work is featured you might wonder who it's aimed at. For all its technical skill, the art is pretty lurid stuff, and ultimately the Machineflesh concept seems to be the problem. In one of

the book's intros, we find implicit criticism of unimaginative CG ("large-breasted robots with laser eyes, anyone?"), while the winner of the 2D category tells us: "The one thing I wanted to avoid, more than anything else, was the idea of a beautiful girl with wires coming out of her head." So what's on the cover? A large-breasted robot girl with wires coming out of her head. Enough said. ●

VERDICT

Unless blood-smeared robo-dog hybrids are your thing, it's probably best to give it a miss **6**

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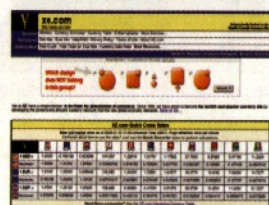


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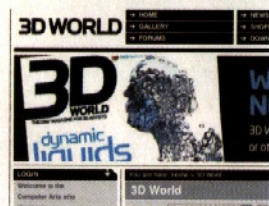
Buyers' guide

Whether you want advice on choosing a specific software package, or an overview of what's on the market, this database of past 3D World reviews contains the information you need to make the right buying decision

Online Resources



● This guide lists prices in Pounds Sterling and US Dollars. For a quick currency conversion: www.xe.com



● For non-3D software, our new online portal holds a wide range of reviews: www.3dworldmag.com



When new 3D users contact the magazine, the most common question they ask is: "Which software package should I buy?" To which the honest response is: "That really depends on you."

Unlike Web design or 2D illustration, there's no single, well-established software package that all professionals use. Instead, choosing a 3D application is largely a matter of personal requirements, not to mention individual taste. Before you begin downloading demos, however, it does help to have a broad overview of what's available – and that's where this buyers' guide comes in.

In this guide, you'll find a list of the key software packages in a particular market sector, the issue of the magazine in which each one featured and a brief summary of the review. These summaries represent a single reviewer's opinion, but they should give you an idea of the key characteristics of each application.

QUESTIONS, QUESTIONS...

Before diving in, there are two fundamental questions you should ask. Firstly, are you pursuing 3D as a professional career? And secondly, what kind of 3D work do you aim to produce?

If the answer to the first question is 'no', the only limitations on your choice of 3D software are your budget and operating system. In the hands of a skilled user, inexpensive applications can generate impressive results, although they might not do so as quickly as more expensive software (or in a way that professional 3D artists would deem conventional).

If you do aim to make a living in 3D, however, you'd be well advised to pick a 'professional' application: those listed in the upper table on the page opposite. Expensive packages don't necessarily generate better results, but they tend to produce work quickly,

flexibly and reliably – all important issues if deadlines are looming. And while studios don't usually hire staff solely on the basis of the software they've used, mastering a 'name' application will familiarise you with high-end tools and increase your chances of freelance work.

Another consideration is whether you intend to produce animations or still images. As a crude generalisation, illustrators and graphic artists often favour pro applications at the lower end of the price scale, while those working in animation, visual effects or game design tend to opt for more expensive packages.

Ultimately, however, there's no substitute for hands-on experience. All major applications have demo versions that you can

CHOOSING APPLICATIONS IS ALL ABOUT PERSONAL REQUIREMENTS AND INDIVIDUAL TASTE

download and experiment with, and before you reject the more expensive packages, remember that many of them – particularly *Maya*, *Houdini*, *LightWave* and *Softimage|XSI* – have free 'learning' editions. Educational deals also offer students the chance to buy full versions of professional software for the price of a handful of DVDs: to see if you qualify, check the website of the software package you're interested in.

Fortunately, there are very few 'bad' 3D packages on the market, so choosing the right one for you ultimately comes down to personal taste. Do your research, consult the magazine, and be prepared to experiment – but above all, enjoy yourself!

ALL-ROUND 3D PACKAGES (UNDER £250)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AIST MOVIE 3D	PC	Cut-down version of <i>Realsoft 3D</i> , aimed mainly at home movie makers dabbling in 3D	£68* (\$132*)	AIST	www.aist.com	N/A	[Not previously reviewed in <i>3D World</i>]	N/A
CARRARA 3D BASICS	Mac/PC	Extremely stripped-down version of a mid-price app, aimed at hobbyists and casual users	£39 (\$49)	Eovia	www.eovia.com	N/A	[Not previously reviewed in <i>3D World</i>]	N/A
CARRARA 4 STANDARD	Mac/PC	Inexpensive all-rounder, lacking some of the high-end tools from <i>Carrara 4 Professional</i>	£209 (\$279)	Eovia	www.eovia.com	60	Still a solid purchase for a novice all-round 3D user on a budget, <i>Carrara 4</i> fixes bugs from earlier versions, but lacks the new rendering tools of the <i>Pro</i> edition	8
GAMESPACE	PC	Cut-down <i>trueSpace</i> with extra games tools, aimed at modders and indie game developers	£154* (\$299)	Caligari	www.caligari.com	46	Goes some way to providing a one-stop solution for the mod community, but one with rough edges on release: those on a real budget may stick to freeware	7
HASH ANIMATION MASTER	Mac/PC	Cult entry-price animation app, chosen by many leading animators for personal work	£154* (\$299)	Hash Inc.	www.hash.com	59	Powerful, intuitive rigging and animation package, complemented by a simple, versatile modeller. Now adds hair support and a sprite-based particle system	9
PIXELS 3D 5	Mac	The premier – and possibly, only – Mac-only 3D package: a cult app amongst Mac fans	£77* (\$149)	Pixels Digital	www.pixelsdigital.com	42	Great value for money, and includes a number of high-end tools, including fluids and cloth. Good render quality, but very slow, and workflow could be improved	8
REALSOFT 3D 4.5 (FOR LINUX)	Linux	Even better value than the PC edition: most Linux users' main alternative to freeware	£140* (\$270*)	Realsoft Graphics	www.realsoft.com	35	Excellent render quality for the price, but more suited to still images than animation work, particularly character animation. OpenGL could be improved	9
SHADE 7 DESIGNER LE	Mac/PC	Very inexpensive, if limited, all-round package, extremely popular with hobbyists in Japan	£55* (\$109)	Curious Labs	www.curiouslabs.com	50	Clearly geared towards the student or amateur, this cheap and cheerful version of its bigger siblings shares the basic modelling tools but is otherwise limited	7
SHADE 7 STANDARD	Mac/PC	Mid-level edition: more expensive than LE, but lacks some key tools of <i>Shade 7 Pro</i>	£107* (\$209)	Curious Labs	www.curiouslabs.com	50	Similar in toolset to the <i>Professional</i> edition, but lacks automatic smoothing and interpolation. A reasonable buy, if you can handle the translation issues!	7

ALL-ROUND 3D PACKAGES (OVER £250)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3DS MAX 7	PC	Long-established 3D package: still a standard in the games and architecture industries	£2,695 (\$3,495)	Discreet	www.discreet.com	59	No major 'hero' features, but improved stability, integrated character studio, and new Normal Mapping and character animation tools make this a worthy upgrade	9
CARRARA 4 PRO	Mac/PC	Inexpensive all-round app, now targeted more specifically at professional illustrators	£419 (\$579)	Eovia	www.eovia.com	60	Retains Eovia's unique – and possibly offputting – system of workflow divided between 'rooms', but dramatically improves animation and high-end rendering	8
CINEMA 4D 9 BASE	Mac/PC	Entry-level edition only: some important tools must be purchased as add-on modules	£425 (\$695)	Maxon	www.maxon.net	58	Not as ground-breaking an upgrade as version 8, but builds on previous incarnations to deliver a capable all-round professional 3D package	9
CINEMA 4D 9 XL	Mac/PC	A powerful renderer makes this increasingly respected app the choice of many illustrators	£1,148 (\$1,895)	Maxon	www.maxon.net	58	[This edition not specifically reviewed in 3D World] Pi User than LightWave, but the MOCCA and Advanced Render modules are essential to many pro artists	9
CINEMA 4D 9 STUDIO	Mac/PC	Top-level edition of Cinema 4D, adding in BodyPaint 2 and unlimited network rendering	£1,871 (\$2,995)	Maxon	www.maxon.net	58	[This edition not specifically reviewed in 3D World] Primarily for large facilities needing unlimited render licenses, although BodyPaint is a useful added extra	9
EIAS 5.5	Mac/PC	Perennial professional-quality animation package with a strong cult following	£463* (\$695)	EI Technology Group	www.eitechnologygroup.com	59	Still an insanely fast rendering and animation package, but now minus a built-in modeller since the last – admittedly thorough – point-five upgrade	8
HOUDINI 7 SELECT	PC/Linux	Entry-level edition, primarily aimed at studios looking to build a lower-cost Houdini pipeline	£825* (\$1,599)	Side Effects Software	www.sidefx.com	25	[Reviewed at version 5] A good additional seat for a Houdini studio, but lack of advanced and character animation tools limit its use as a standalone package	7
HOUDINI 7 MASTER	PC/Linux	Powerful procedural animation package: few skilled users, but a staple of much VFX work	£8,769* (\$17,000)	Side Effects Software	www.sidefx.com	41	[Reviewed at version 6] Retains all the power of previous versions, but makes considerable advances in terms of ease of use. Also adds GI rendering	8
LIGHTWAVE 3D 8	Mac/PC	Another long-established package, used in a wide range of work, notably TV effects	£995 (\$1,595)	NewTek	www.newtek.com	53	Vastly improves character animation and dynamics, and streamlines workflow, but leaves the renderer and underlying structural problems of the app untouched	8
MAYA 6.5 COMPLETE	Mac/PC/Linux	Lacks some high-end tools, but an affordably priced edition of Maya for many 3D markets	£1,499 (\$1,999)	Alias	www.alias.com	64	It might have improved polygon modelling and faster animation tools, but there's still no proper docs for mental ray and the proxies need more work	7
MAYA 6.5 UNLIMITED	Mac/PC/Linux	Powerful all-round package: still the one to beat when it comes to film effects work	£4,899 (\$6,999)	Alias	www.alias.com	64	Slicker rendering in mental ray but it's not exactly a perfect upgrade – it feels like half an improvement. Artists on a budget may want to wait for Maya 7	7
REALSOFT 3D 5 (FOR PC)	PC	Underpublicised, but well-regarded, mid-priced application: good built-in renderer	£415* (\$795*)	Realsoft Graphics	www.realsoft.com	61	Enhanced Sub-0 modelling and texturing make this a viable alternative to better-known 3D illustration apps. Still weak at character animation, however	9
SHADE 7 PRO	Mac/PC	Very popular Japanese package. Still relatively unknown in the West, but may gain ground	£521* (\$1,009)	Curious Labs	www.curiouslabs.com	58	Robust modelling tools and a reasonably powerful renderer, but the interface and animation tools will seem unconventional to many Western 3D artists	7
SOFTIMAGE XSI 4 FOUNDATION	PC/Linux	Aggressively marketed entry-level edition of a leading 3D app: very powerful for the price	£299 (\$495)	Softimage	www.softimage.com	55	Fuller featured than many entry-level editions of major packages, Foundation – originally sold for \$1,995 – sets a new benchmark for 3D software pricing	9
SOFTIMAGE XSI 4 ESSENTIALS	PC/Linux	Powerful, well-balanced all-round package, also much reduced in price over the last year	£1,275 (\$1,995)	Softimage	www.softimage.com	55	A solid upgrade to a powerful package, adding new rigid-body dynamics, a fully non-linear modelling workflow and improved texturing and materials tools	9
SOFTIMAGE XSI 4 ADVANCED	PC/Linux	Widely used in games and VFX, but struggles for market dominance with 3ds max and Maya	£4,405 (\$6,995)	Softimage	www.softimage.com	55	For power users, XSI 4 Advanced also throws in BatchServe and eight satellite render licences for free. Still no decent NURBS or curve tools, though!	9
STRATA 3D CX	Mac/PC	Long-established, if relatively niche, mid-price 3D package: now targeted at illustrators	£346* (\$695)	Strata	www.strata.com	55	A capable, if idiosyncratic, package for a print graphic artist looking to learn Photoshop and Illustrator with a little 3D. Far weaker for animation, however	7
TRUESPACE 6.6	PC	Another fixture in the increasingly crowded mid-price 3D software market, still widely used	£910* (\$595)	Caligari	www.caligari.com	38	Improving animation and dynamics, version 6.6 addresses many of TrueSpace's shortcomings, but the current interface now looks to have reached its limits	8



TALKING POINT | Why use commercial 3D software at all?

IF YOU'RE ON a restricted budget, there is an alternative to the software listed above: an open-source 3D package. The best-known is *Blender*, which is now released under the GNU General Public Licence, along with its companion product, the raytrace renderer *Yafaray*. While it would be unrealistic to expect free software to contain all the cutting-edge features of commercial apps,

Blender possesses a standard modern modelling, rigging and animation toolset, is regularly updated, and is supported by an active user community (see www.cgtalk.com). Users may also benefit from its system requirements: It runs on Windows 98, Mac OS 10.2+ or Linux 2.2.5 i386 and only requires a 300MHz CPU and 128MB RAM. www.blender3d.org

TEXTURING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BODYPAINT 3D 2	Mac/PC	Powerful specialist 3D painting package, used on increasingly high-profile VFX projects	£425 (\$745)	Maxon	www.maxon.net	47	Much quicker and simpler to use than the first release, and results can be stunning. Rock solid and well documented, but one for specialist texture artists	9
DEEP PAINT 3D 2	PC	Established 3D painting app, but not recently updated, and losing headlines to <i>BodyPaint</i>	£307* (\$595)	Right Hemisphere	www.righthemisphere.com	26	Powerful, but RAM-hungry, and advanced mapping tools are presented in a separate app, <i>Deep UV</i> . Not recently updated, however, unlike <i>BodyPaint 3D</i>	8
PAINT SHOP PRO 9	PC	Inexpensive 2D painting and bitmap editing app, unfairly regarded as 'just for hobbyists'	£99.95 (\$129)	Corel	www.corel.com	57	Fantastic value for money, and version 9 adds a proper History palette. Does nearly anything that <i>Photoshop</i> can, but needs better Alpha channel support	9
PHOTOSHOP CS	Mac/PC	The <i>de facto</i> standard for texture painting and image manipulation amongst CG artists	£515 (\$649)	Adobe	www.adobe.com	48	Still <i>de rigueur</i> for professional 3D work. Few must-have features for 3D users in the latest release, but integrated photo-stitching and Match Colours are handy	8

MODELLING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AC3D	PC/Linux	Low-cost modeller with poly, Sub-D and Boolean tools, mainly aimed at games work.	£25.65* (\$49.95)	Inivis	www.ac3d.org	N/A	[Not previously reviewed in 3D World]	N/A
AMAPI DESIGNER 7	Mac/PC	Long-established modelling package, boasting a unique workflow and interface.	£339 (\$479)	Eovia	www.eovia.com	40	A powerful modelling package, particularly for organic objects, although users will either love or loathe the interface, and documentation could be improved.	9
AMAPI 7.5 PRO	Mac/PC	Amapi Designer's new bigger sibling, intended as a serious alternative to pricier applications.	£559 (\$779)	Eovia	www.eovia.com	62	Professional version of Amapi, aimed at industrial modelling. Awesome Dynamic Geometry and better NURBS modelling but tool/command validation is tricky.	9
AMORPHIUM 3	Mac/PC	Blob-based modelling package, very popular with hobbyists, but not recently updated.	£76* (\$145)	EI Technology Group	www.eitechnologygroup.com	35	A unique organic modelling package, only basic Sub-D tools, a slow renderer and a rather clunky interface, but what it does do, it does extremely well.	8
FORM+Z 5	Mac/PC	Powerful, long-established all-round modeller, used on a wide range of industrial projects.	£794* (\$1495)	Auto*des*sys	www.formz.com	63	This is a premium modelling package – a hybrid solid and surface modeller. With strong NURBS tools and decent renderer, it has a steep learning curve.	8
MOD0	Mac/PC	Powerful, customisable and Mac-friendly new Sub-D modeller, created by ex-NewTek staff.	£359* (\$695)	Luxology	www.luxology.com	60	A relatively pricey addition to a crowded market sector, but one with a uniquely customisable modular design. Some early stability issues, but improving rapidly.	8
RHINO 3	PC	Another well-established app, at the lower end of the price scale for industrial modellers.	£462* (\$895)	Robert McNeel & Associates	www.rhino3d.com	36	New NURBS tools and shading modes make this package a strong all-rounder. Will soon need upgrading to keep pace with newer competitors, however.	8
SIL0 1.3	Mac/PC	New specialist Sub-D modelling package, inexpensive, and improving with every build.	£56* (\$109)	Nevercenter	www.nevercenter.com	55	Has evolved into a promising app, following early stability issues. Quirky UV mapping, but good crossover between Sub-D and poly tools, and customisable.	9
ZBRUSH 2	Mac/PC	Powerful, intuitive organic modelling package currently gaining very strong word of mouth.	£252* (\$489)	Pixologic	www.zbrush.com	53	A new interface helps redefine ZBrush 2 as a professional 3D sculpting tool. Still some quirks, but many unique tools and capable of handling millions of polys.	9

CHARACTER AND FACIAL ANIMATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
DAZ STUDIO	Mac/PC	Long-awaited new rival to Poser, currently still available as a free public beta.	Free	DAZ Productions	www.daz3d.com	N/A	[Not previously reviewed in 3D World]	N/A
ENDORPHIN 1.6	PC	Innovative 'motion-synthesis' system using AI 'actors' to generate artificial mo-cap data.	£7.995 (\$12.975)	NaturalMotion	www.naturalmotion.com	56	Brilliant, technically accomplished, and fun to use to boot. Generates data no real-world stuntman could achieve, and now supports multiple characters.	9
FACESTATION 2	PC	Turn video footage of an actor's face into instant animation, for 3ds max and Maya.	(£1,041* (\$1,995))	Digimation	www.digimation.com	33	Fast facial tracking, and can work with real-time capture. Resource hungry, however, and the quality of the results is only as good as your morph targets.	8
LIFESTUDIO:HEAD 2.5 STANDARD EDITOR	PC	Customise a pre-built head model, apply instant lip synch and export as OBJs or an AVI.	£310 (\$599)	LifeMode Interactive	www.lifemod.com	44	Good texturing tools, but some tweaking is required to finesse the lip synch generated automatically from an audio track. Manual and UI need tidying up.	8
LIFESTUDIO:HEAD 2.5 PRO ARTIST	PC	Create and rig facial models for 3ds max and Maya, then apply instant lip-synching.	£990 (\$1,914*)	LifeMode Interactive	www.lifemod.com	44	As the Standard Editor, but with the power to import/export directly to Maya or 3ds max. One of the first proper tools of this kind: a time-saver for games artists.	8
MESSIAH:ANIMATE 5	PC	Powerful standalone animation package, also available as a plug-in for major 3D packages.	£125* (\$239)	pmG Worldwide	www.projectmessiah.com	29	[Reviewed at version 3] A comprehensive character animation solution with very fast IK and deformation and powerful expressions. Now reduced in price.	8
MESSIAH:STUDIO 2	PC	Messiah:animate's larger parent product, adding in full rendering capabilities.	£518* (\$995)	pmG Worldwide	www.projectmessiah.com	58	Not an industry-standard application (and lacks modelling tools), but offers intuitive, fast and powerful GI rendering and is capable of some amazing results.	7
MOTIONBUILDER 6 STANDARD	Mac/PC	Innovative 'motion design' package, originally developed by Kaydara, now owned by Alias.	£532* (\$995)	Alias	www.alias.com	46	[Reviewed at version 5] Powerful FK/IK blending and real-time playback, plus a new Story Window to keep things organised. Quickly becoming indispensable.	9
MOTIONBUILDER 6 PRO	Mac/PC	Pro motion-editing app: an industry standard for blending mo-cap and keyframe data.	£2,244* (\$4,195)	Alias	www.alias.com	62	High-end tools include mo-cap data editing and data retargeting. It might be a tad expensive, but it's probably the best character animation tool around.	8
POSER 6	Mac/PC	The original figure-posing application, also used for pre-viz and simple animation work.	£157 (\$249)	Curious Labs	www.curiouslabs.com	65	Despite a few niggles, well-chosen workflow enhancements and a lot of new content make Poser 6 a vital upgrade. Still undisputed champ in this market sector.	8

RENDERING

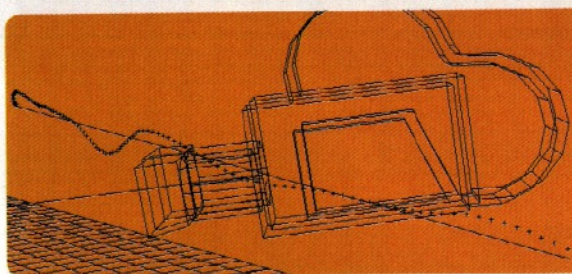
PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AIR	PC/Linux	RenderMan-compatible hybrid scanline/ raytrace renderer, used in film and stills work.	£231* (\$450)	SiTex Graphics	www.sitexgraphics.com	N/A	[Not previously reviewed in 3D World]	N/A
ART•LANTIS 4.5	Mac/PC	Old-school architectural rendering package, now awaiting an update to version 5.0.	£349	Abvent	www.abvent.com	13	This interactive package is capable of high-quality results and provides decent renders quickly, without fuss. Few fine controls, though, and not recently updated.	7
BRAZIL R/S	PC	Powerful 3ds max renderer, used in both stills and effects work: soon to be ported to Maya.	£617* (\$1,200)	SplutterFish	www.splutterfish.com	31	Fast and robust, with an excellent shader system, delivering high-quality results. Bucket rendering allows fast distributed rendering across a network.	9
FINALRENDER STAGE-1	PC	Another powerful 3ds max renderer, often used in architectural visualisation work.	£415* (\$795)	Cebas	www.finalrender.com	43	Powerful new HyperGI engine and caustics tools, but exceptional results require a lot of tweaking. Some instabilities, particularly in distributed renders.	7
MENTAL RAY 3	Mac/PC/ Linux	A built-in renderer in 3ds max, Maya and XSI usually used for stills or short-form work.	Licensed for use	mental images	www.mentalimages.com	N/A	[Not previously reviewed in 3D World]	N/A
POV RAY	Mac/PC/ Linux	Justifiably popular freeware 3ds max renderer, capable of very high quality results.	Free	POV-Ray	www.povray.org	N/A	[Not previously reviewed in 3D World]	N/A
RENDERMAN 12	Mac/PC	Pixar's rendering workhorse for production pipelines: the standard for film effects work.	£1,808* (\$3,500)	Pixar	renderman.pixar.com	36	[Evaluated at version 11] Fast, excellent memory usage and a well-documented shader language. Now incorporates GI rendering tools and selective raytracing.	N/A
TURTLE	Mac/PC/ Linux	Third-party Maya renderer, designed to offer a new balance of speed and image quality.	£619* (\$1,199)	Illuminate Labs	www.illuminatelabs.com	55	Blisteringly fast raytrace rendering. Currently best suited to architectural work, due to lack of support for particles and Paint Effects, but developing rapidly.	7
V-RAY	PC	Lower-priced rival to Brazil: a third-party 3ds max renderer for stills and effects work.	£154* (\$299)	Chaos Group	www.vrayrender.com	N/A	[Not previously reviewed in 3D World]	N/A

COMPOSITING AND EFFECTS

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AFTER EFFECTS 6 STANDARD	Mac/PC	One of the most popular desktop compositing packages, usable even for broadcast work	£565 (\$699)	Adobe	www.adobe.com	47	Updated video painting features, plus the addition of Photoshop's Liquify tool make for a major upgrade. Still the same cluttered old interface, however	8
AFTER EFFECTS 6 PROFESSIONAL	Mac/PC	As <i>After Effects Standard</i> , plus some high-end tools: worth investing in for professional work	£915 (\$999)	Adobe	www.adobe.com	47	Motion tracking, enhanced keying and masking, particle systems and 16-bit colour tools make this a better option than <i>AE Standard</i> for serious 3D work	8
COMBUSTION 4	Mac/PC	Discreet's own desktop compositor, unsurprisingly often teamed with <i>3ds max</i>	£850 (\$995)	Discreet	www.discreet.com	65	Very strong basic tools, well-organised workflow and good compatibility with 3D apps, but poorer editing app integration and a relatively steep learning curve	9
DFX+ 4	PC	Cut-down, modular version of <i>Digital Fusion</i> , much beloved of PC-based <i>LightWave</i> artists	Priced by module	eyeon Software	www.eyonline.com	43	Most of the improvements in version 4 are cosmetic, but still a powerful, affordable, node-based compositing app. Good visual effects and 3D tools	8
DIGITAL FUSION 4	PC	One of the first PC-based desktop compositing packages, but still relatively little known	£2,579* (\$4,995)	eyeon Software	www.eyonline.com	43	Not limited to 8-bit colour space, unlike <i>DFX+</i> , making this a powerful – and underrated – PC-based compositor, capable of scaling to film-quality work	8
MOTION	Mac	Entry-level motion-graphics package, suitable for simple compositing, titling and effects	£199 (\$299)	Apple	www.apple.com	61	Good masking and particle tools; not simply a cut-down version of <i>After Effects</i> . No tracking or true 3D layers, though, and the interface can be sluggish	8
SHAKE 3.5	Mac/Linux	Powerful node-based desktop compositor, used even in film and broadcast effects	£2,099 (\$2,999)	Apple	www.apple.com	54	The most powerful desktop compositor on the market, with the possible exception of <i>Digital Fusion</i> . Version 3.5 adds long-awaited morphing tools	8

CAMERA TRACKING AND MATCH MOVING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3D EQUALIZER 3	Mac/Linux	Venerable (and Oscar-winning) tracking package, still widely used in film effects	On request	Science-D-Visions	www.3dequalizer.com	N/A	[Not previously reviewed in <i>3D World</i>]	N/A
BOUJOU 3	Mac/PC/Linux	One of the first major alternatives to <i>3D Equalizer</i> , popular in the effects world	£5,190* (\$10,000)	2d3	www.2d3.com	64	Version 3 is still a powerful tracking package, but this much-delayed and largely unsurprising update may prove a disappointment to long-term <i>boujou</i> users	6
BOUJOU BULLET	Mac/PC/Linux	Cut-down, wizard-driven version of <i>boujou</i> , intended for small to medium-sized facilities	£1,307* (\$2,500)	2d3	www.2d3.com	64	Aimed at smaller post facilities, <i>bullet</i> has good basic 2D and 3D tracking and accepts any resolution footage, but can prove unreliable with zoom shots	7
MATCHMOVER PRO 3.1	Mac/PC/Linux	Another of the old guard of desktop tracking applications, recently reduced greatly in price	£2,062* (\$3,500)	Realviz	www.realviz.com	63	A highly evolved version of the software, with powerful 2D and 3D tracking tools. No optical flow facility, however, and the mo-cap module costs a lot extra	7
PFHOE	Mac/PC	A powerful low-cost DV tracking application, named by <i>3D World</i> readers (see issue 61)	£49 (\$94*)	The Pixel Farm	www.thepixelfarm.co.uk	62	With fast and robust auto-tracking, <i>PFHOE</i> is great value for money and ideal for its target audience of aspiring digital filmmakers and independent artists	9
PFMATCH	Mac/PC	<i>PFTTrack</i> 's younger sibling, offering a useful range of tracking tools at an entry-level price	£600 (\$1,160)	The Pixel Farm	www.thepixelfarm.co.uk	57	Great price, although only broadcast-resolution footage in AVI and QT formats is supported. Good user control in version 1.5, but no proxy-resolution tracking	8
PFTTRACK 2	Mac/PC	First of a new generation of lower-priced broadcast-quality camera tracking packages	£3,000 (\$5,801*)	The Pixel Farm	www.thepixelfarm.co.uk	57	Fast and robust 2D and 3D tracking, with powerful optical flow and analysis tools. Affordable, although recently undercut in price by <i>MatchMover Pro</i>	9
SYNTHEYES	PC	Astonishingly affordable new all-round tracking package, gaining good word of mouth	£1,180* (\$349)	Andersson Technologies LLC	www.ssontech.com	49	An incredible range of tools for the price. Outperforms costlier rivals on many tasks, but workflow can feel counter-intuitive for those used to other apps	9



TALKING POINT | Where next for camera tracking?

SINCE THE TURN of the decade, studios have been turning to specialist camera-tracking packages to integrate CG elements with source footage. Although 2D and 3D tracking have been possible for years, true object

tracking has only just become available in commercial software, most recently in *PFTTrack 3*. Technical revolution or evolution? Find out in our reviews section this issue. *PFTTrack 3* is reviewed on page 92

LANDSCAPE GENERATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BRYCE 5	Mac/PC	The original landscape generator, now back in development after several years in limbo	£46* (\$89.95)	DAZ Productions	bryce.daz3d.com	16	Often dismissed as a toy for hobbyists, <i>Bryce</i> is easy to use and renders at high quality. Good for photorealistic backgrounds, even with a slow renderer	8
MOJOWORLD 3	Mac/PC	Unusual landscape-generation app with a unique emphasis on creating entire planets	£104* (\$199)	Pandromeda	www.pandromeda.com	60	A unique approach to landscape generation that will divide users. Some great tools, but hard to control fine details and the interface can be frustrating	6
VUE 5 ESPRIT	Mac/PC	Landscape generation's current market leader, high-quality results at an affordable price	£171 (\$249)	e-on Software	www.e-onsoftware.com	59	Rightly the best-selling landscape generator: very realistic results, and easy to master. New GI rendering is slow, however, and still no proper animated water	9
VUE 5 PRO STUDIO	Mac/PC	The <i>Vue 5 Esprit</i> core, augmented by four add-on modules (also purchasable separately)	£274 (\$399)	e-on Software	www.e-onsoftware.com	65	A well-rounded set of add-ons. Although some features should arguably be in the core app, <i>Mover</i> (Poser import) and <i>Botanika</i> (plant editing) are of real value	8
WORLD CONSTRUCTION SET 6	Mac/PC	Technical, but very powerful, package: well suited to tasks requiring real-world accuracy	£258* (\$500)	3D Nature	www.3dnature.com	13	[Reviewed at version 5] A versatile and comprehensive landscape program, the interface is unintuitive with a steep learning curve and no simple mode	8
WORLDBUILDER GENESIS	PC	A popular alternative to the <i>Vue</i> family, more powerful than <i>Bryce</i> , less technical than <i>WCS</i>	£92* (\$179)	Digital Element	www.digi-element.com	57	Beautiful end results, and fairly easy to use. Now very much optimised for <i>3ds max</i> , though, while some of the new features and the tutorials lack polish	7
WORLDBUILDER PRO 4	PC	Higher-end edition of <i>WorldBuilder</i> , tailored to pro graphics artists rather than hobbyists	£360* (\$699)	Digital Element	www.digi-element.com	57	A terrific program with many unique features, particularly for plant and water animation, and great user control over fine detail. But see reservations above	7

WEB 3D AND MULTIMEDIA

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
ANARK STUDIO 3	PC	Established authoring package for interactive 3D presentations	£1,835* (\$3,499)	Anark	www.anark.com	64	A powerful solution for large-scale, real-time 3D, but the new higher price and absence of Mac support will leave some existing users high and dry	8
AXELEDGE 2	Mac/PC	All-in-one authoring and online animation package, described as 'like Flash in 3D'	£305* (\$595)	MindAvenue	www.mindavenue.com	33	Powerful all-round authoring package, with good animation and interaction editing tools. Import and export options much improved since version 2.0	8
CULT3D	Varies	Free software suite for exporting 3ds max and Maya models in interactive online format	Free	Cycore	www.cycore.com	12	[Reviewed using the 3ds max exporter] Relatively straightforward to use, with a good range of options in the exporter. Very much more stable in recent builds	7
DIRECTOR MX 2004	Mac/PC	De facto standard for authoring multimedia CDs/DVDs; now incorporating simple 3D tools	£809 (\$1,099)	Macromedia	www.macromedia.com	37	Greatly improved layout, but few new 3D tools since version 8.5. Havok physics and useful Web output tools, but programming needed for complex effects	7
QUEST3D 2.1 ENTERPRISE	PC	Real-time 3D authoring tool, also available in cheaper Lite and Professional editions	£1,035* (\$1,999)	Act-3D	www.quest3d.com	48	Full-featured all-round authoring app, but fairly easy to master; no programming required. Can become unmanageably cluttered on complex projects, though	8
SWIFT 3D 4	Mac/PC	3D to vector graphics conversion tool; one of the most regularly updated interactive 3D apps	£97* (\$189)	Electric Rain	www.swift3d.com	56	No major new tools, but several key usability tweaks see this 3D-to-Flash app maturing as a package. Generates simple animations quickly and painlessly	9
WIREFUSION 4 ENTERPRISE	Mac/PC/Linux	Visual authoring tool for interactive 3D content; also available in cheaper editions	£1,195 (\$1,995)	Demicron	www.demicron.com	56	Straightforward all-round authoring solution; no need for programming or specialist plug-ins to view output. Slightly unorthodox, but quick to master	8

OTHER TOOLS

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3D S.O.M.	PC	Image-based modelling software; one of the newer, less expensive additions to the market	£299 (\$582*)	Creative Dimension Software	www.3dsom.com	43	Requires photos of an object against a marker grid like D Sculptor or iModeler, but offers greater automation and can use uncalibrated images for texturing	8
D JOINER	PC	Photo-stitching software; less widely known than Stitcher, but suitable for many projects	£300 (\$575*)	D Vision Works	www.d-vw.com	20	In good hands, it does what it's meant to do. But it suffers from a lack of auto-features and poor usability. Documentation is disappointingly slim, to boot	7
D SCULPTOR 2 STANDARD	PC	Image-based modelling software; another mid-priced package, aimed at home users	£500 (\$960*)	D Vision Works	www.d-vw.com	11	[Reviewed at version 1.1] A good tool for creating 3D models from images, and cheaper than ImageModeler. Much slower and not as powerful, however	8
DEEP EXPLORATION 3.5	PC	File-conversion software; capable of tackling a wide range of file formats, including CAD	£77* (\$149)	Right Hemisphere	www.righthemisphere.com	45	Well-designed model viewer, file conversion and asset-management utility. Includes basic 3D model editing tools, rendering and Shockwave output	8
FRAMEFORGE 3D STUDIO	Mac/PC	Storyboarding software; first of a new wave of apps aimed at previz and 3D storyboarding	£180* (\$349)	Innoventive Software	www.frameforge3d.com	55	Extremely easy to use, and scales to even high-budget movies. Specialised props only available as add-on packs, though, and complex scenes can be sluggish	9
IMAGEMODELER 4	Mac/PC	Image-based modelling software; one of the earliest desktop photogrammetry packages	£712* (\$1,380)	Realviz	www.realviz.com	59	Gives professional-quality results, and can cope with architectural-sized objects, but requires considerable user input. Quality also comes at a price	7
IMODELLER 3D 2.5 WEB	Mac/PC	Image-based modelling software; creates 3D models for online use, in a Java-based format	£70* (\$134*)	UZR	www.imodeller.com	58	Like the pro version but cheaper. With the right objects, this can produce quite impressive results. Wait until the release of version 3, which supports concavity	6
IMODELLER 3D 2.5 PRO	Mac/PC	Image-based modelling software; all-purpose app, exporting to a range of 3D file formats	£352* (\$675*)	UZR	www.imodeller.com	58	Impressive and more powerful than its main rival, D Sculptor. It has too many irritations, it may be easy to learn, but it's quirky and frustratingly unstable	6
NUGRAF 4.1	PC	File-conversion software; powerful, with support for batch conversion and CAD data	£256* (\$495)	Okino	www.okino.com	21	[Reviewed at version 4.1] This affordable package performs a demanding task exceptionally well and is relatively affordable. User interface is a tad dated	8
PARTICLEILLUSION 3	Mac/PC	Particle software; generates 3D-style effects in 2D. Niche, but used on many pro projects	£206* (\$399)	Wondertouch	www.wondertouch.com	41	A fast, flexible alternative to conventional 3D particle effects, and fits well into production pipelines. Would be improved by more specific forces and user control	8
POLYTRANS 4	PC	File-conversion software; cut-down version of NuGraf. Lacks batch conversion facilities	£204* (\$395)	Okino	www.okino.com	2	[Reviewed at version 1.1] Not your everyday 3D program, but a very useful one that all 3D artists should consider. Conversion doesn't always run smoothly	7
REALFLOW 3	Mac/PC/Linux	Fluid-simulation software; the current market leader for realistic fluids, used in film projects	£620* (\$1,200)	Next Limit	www.nextlimit.com	60	Sets the benchmark for power and controllability for fluid simulation systems, but at a price. Still some stability and UI issues, particularly in the Mac version	7
STITCHER 4.0	Mac/PC	Photo-stitching; the leader in its field, though similar tools are now present in Photoshop	£299* (\$580)	Realviz	www.realviz.com	50	Incredibly powerful and versatile. Not a quick solution, but stands above the competition in quality of results, although that quality comes at a price	7
STORYVIZ	PC	Previzualisation software; the latest in a new wave of previz and storyboarding apps	£1,858* (\$3,600)	Realviz	www.realviz.com	60	Far more flexible and open-ended than simple storyboarding apps, and includes a timeline and keyframe animation capabilities. A serious investment, however	8



CONTACT US | Have we missed anything?

THINGS CAN CHANGE very quickly in the world of 3D software. If you've spotted an error in this buyer's guide, please contact us at the email address below. However, before writing in, please bear the following points in mind:

1. All prices exclude VAT and shipping, plus any optional extra costs, such as printed manuals or maintenance contracts.
2. Asterisks denote currency conversions from a list price at the current rate of exchange when the entry was added to the buyer's guide.

3. Due to limitations of space, not all sectors of the 3D market can be covered each issue. We aim to vary our listings from month to month.
4. Space also precludes us from listing the thousands of plug-ins currently available.
5. The verdict column contains a synopsis of our last published review. In most cases this will refer to the current version of the software. Where this is not so, it should be clearly noted.

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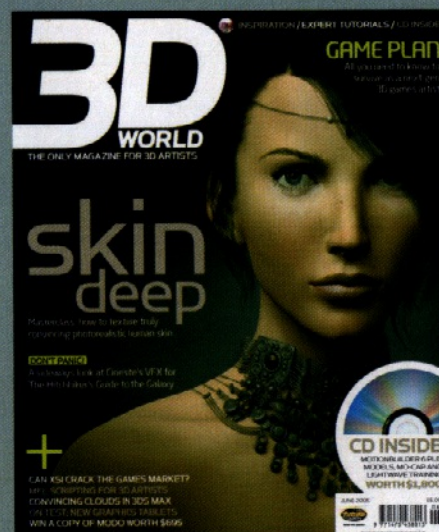
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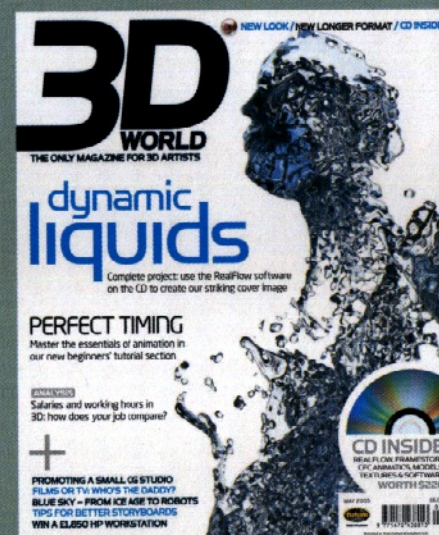
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DYNAMIC LIQUIDS
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studio profile

Useful information for 3D artists seeking work at visual effects companies.
This issue: **CafeFX**



BASED

Santa Maria, USA

PREVIOUSLY WORKED ON

- *The Aviator* (2004)
- *Hellboy* (2004)
- *The Terminal* (2004)
- *League of Extraordinary Gentlemen* (2003)
- *Master and Commander: The Far Side of the World* (2003)
- *Gothika* (2003)
- *Spy Kids 3-D: Game Over* (2003)
- *Spy Kids 2: Island of Lost Dreams* (2002)
- *Panic Room* (2002)

HR CONTACT

Jonathan Stone (jonathan@cafefx.com)

URL

www.cafefx.com

TYPE OF WORK UNDERTAKEN

CGI and compositing-based visual effects work for feature films in Santa Maria, with a separate facility for commercials and music video work in Santa Monica

NUMBER OF FULL-TIME EMPLOYEES

50

TYPICAL NUMBER OF FREELANCERS

30

TYPICAL NUMBER OF FULL-TIME RECRUITS PER YEAR

10

LOOKING FOR USERS OF WHICH 3D SOFTWARE?

- *Maya*
- *LightWave*

KEY SKILLS FOR EMPLOYEES

- Character animators
- Texturing artists
- Lighting artists
- Matchmoving artists
- 3D generalists

DESIRABLE SKILLS FOR EMPLOYEES

Same as above

MAXIMUM LENGTH OF DEMO REELS

Ten minutes

PREFERRED FORMAT FOR DEMO REEL SUBMISSIONS

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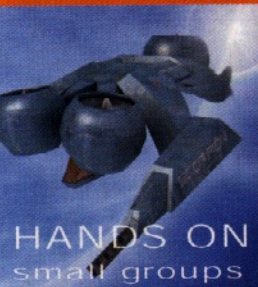
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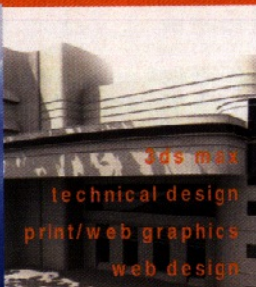
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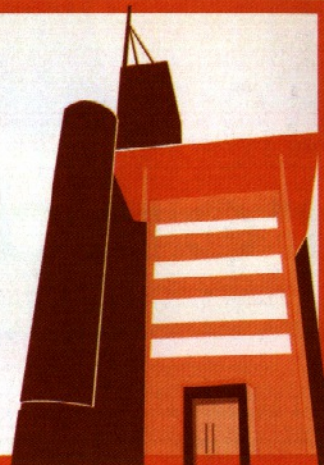
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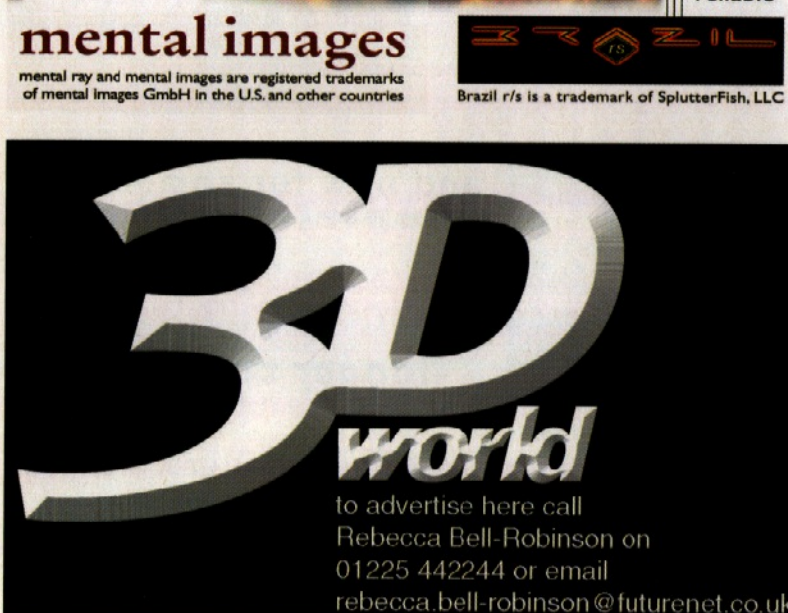
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BCI-3 CMorY	£1.16	TO37 Col	£2.34	C6578 Col	£10.56
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720VA920 Bk	£14.09	TO321 Bk	£2.93	C6656 Bk	£9.38
720VA920 Col	£15.26	TO322\3or4	£2.34	C6657 Col	£11.74
A920VA960 Bk	£14.09	TO331 Bk	£2.93	C6658 Pto	£10.56
A920VA960 Col	£15.26	TO332\3\4\5or6	£2.93	C8727 HCBk	£9.39
Epson	From	TO341 Bk	£2.93	C8728 Col	£11.74
SO20093 Bk	£1.16	TO342\3\4\5or6	£2.93	Lexmark	From
SO20089 Col	£1.75	TO347or348	£3.51	10N0016 Bk	£12.91
SO20187 Bk	£1.16	TO431 HCBk	£2.93	10N0026 Col	£14.09
SO20191 Col	£1.75	TO441 Bk	£2.34	10N00217 Bk	£9.39
TO07 Bk	£1.75	TO442\3or4	£2.34	10N00227 Col	£10.56
TO08 Col	£2.93	TO481 Bk	£2.34	12A1970 Bk	£10.56
TO09 Photo	£2.93	TO481\2or3	£2.34	15M0120 Col	£11.74
TO13 Bk	£1.16	TO484\5or6	£2.34	17G0050 Bk	£10.56
TO14 Col	£1.75	TO551 Bk	£2.93	17G0060 Col	£11.74
TO17 Bk	£1.75	TO552\3or4	£2.93	18L0032 Bk	£12.91
TO18 Col	£2.34	TO557 P\Mate	£8.21	18L0042 Col	£14.09


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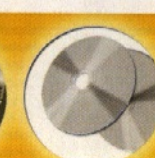


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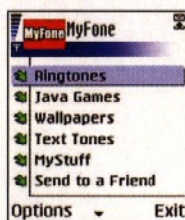


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BUSINESS END

Each issue, our panel of experts answers the legal and financial questions of freelancers and small studios. This month, we ask...

"Can I use their logos?"

Q I'm producing a football-related game, and I'm quite excited, as I expect it to be a good seller. However, I've never produced a sports game before, and I'd like to know whether I can safely use the logos of the clubs that are featured, and the names and images of players, or whether I should be getting some sort of consent? **MAX MACPHERSON**

A This is something of a legal minefield, so bear with us! Club logos and the images and names of players are usually protected, and the first thing you should consider is the jurisdiction(s) in which your game will be available. You should take specific local advice in any territory in which you're seeking to release the game, or plan to make the game available for downloading from the Internet. As usual, the advice in this column is based on English law.

You'll need to identify which of the above elements you'll be using in your game, and therefore which ones you may need to clear. Certain team names, logos and crests may be registered as trademarks. While you can carry out searches in respect of such ownership at the trademark registries of the jurisdictions where you intend to market/sell the game, it can be prohibitively expensive to carry these out, especially if you're intending to market the game in a number of territories.

In the event that you don't obtain consent to such use, even if a team name has been registered as a trademark for games, it may still be possible to use the name in the game itself, on the basis that you're using the mark merely to identify a team or teams, rather than in a way that endorses your game.

THE RIGHTS STUFF

However, if the club name and/or logo is protected as a *copyright* work, and it's copied or reproduced in your game, the club could bring an action for copyright infringement against you. If the club's logo is fairly new, the club may also have the right to bring a claim for registered and/or unregistered design-right infringement against you based on UK or EU design rights. The biggest risk you face is being accused of 'passing off', if there's the suggestion of a link between your game and the team(s).

The laws of a number of countries (including certain states in the US) provide for specific personality or image rights, but English law doesn't provide any such right. Check if a player's name has been registered as a trademark; the same considerations as for registered team names will apply as set out above.

Even in the absence of a trademark registration, you'll still need to take care that the player won't be entitled to bring an

action for passing off or false endorsement. A claim for passing off could be brought if there's a likelihood that a person using the game will believe that the particular player has endorsed or approved the game in some way. Formula One driver Eddie Irvine brought a successful High Court action against Talksport Radio for the use of his image without prior permission; Irvine was able to show that such use amounted to a false endorsement of the station under the law of passing off. Initially, the court awarded Irvine nominal damages of £2,000, which was later increased to £25,000 when he was able to show that this amount was typically what he was able to charge at the relevant time for legitimate similar endorsement work. But it may be more difficult for any one player to bring a passing off claim if a number of players' names are used in the game, and provided that the names are not used on packaging or in advertising.

If the exact strip of a particular club is used in the game then this may amount to an infringement of the club's copyright or design right in the strip (which may be protected as an artistic work). There's also the risk here of a passing off claim, as colours are indicative of teams and therefore may imply that a club, or the league as a whole, endorses your game. In these circumstances, it's less likely that a claimant would succeed in an action against you for passing off, although it doesn't mean that they won't launch a claim against you.

In terms of damages, if a successful claim is made against you a court could calculate damages based on an account of profits (which is just one way in which loss is calculated); therefore, the more games you sell, the more you'll have to pay. The court can also award damages based on the value of a typical licence between you and the club.

But don't be disheartened. In the past, the English Football Association has been prevented from bringing an action for trademark infringement for use of its marks in what appears to be an incidental fashion, on the basis that such use did not amount to use of the trademark, and therefore no infringement could occur.

Above all, you really ought to clear all the rights in your game, even if you think it's something insignificant.

Lucy Adler and Lee Gage are solicitors at the Intellectual Property Group, dealing with all aspects of protection and exploitation of client's rights in relation to traditional and new media.
[w] www.harbottle.com

OTHER RESOURCES

www.patent.gov.uk
The UK Patent Office

www.uspto.gov
The US Patent Office

www.ohim.eu.int/en
European site for The Office of Harmonisation of the Internal Market

www.premierleague.com
The official website of the Premier League

www.sportandtechnology.com/page/0035.html
More about Image rights and the Eddie Irvine case

THE BIGGEST RISK IS BEING ACCUSED OF PASSING OFF

IMPORTANT NOTE

This article is written in general terms, and is not legal advice. Before taking any action on the basis of its contents you should take specific legal advice. Neither 3D World nor Harbottle and Lewis LLP will be responsible for the results of your acts or omissions that are made on the strength of this article

Making The Mantis Parable Part One

Cyan's Josh Staub chronicles the highs and lows of creating an independent animated short, and assesses what lessons his experiences hold for others



MOST ANIMATORS DREAM of making their own movies. But how do you go about turning that dream into a reality? Over the course of this four-part production diary I'll attempt to demystify the process of making and

marketing an animated short, based on my experiences with my own eight-minute film, *The Mantis Parable*.

De-Myst-ifying is actually a pretty good word to use, because by day, I'm the Art and Visual Design Director for Cyan Worlds, creators of the computer games *Myst*, *Riven* and *URU*. But I've always wanted to learn the art of story-telling in a linear medium and so, in 2003, I set out to create my own animated short. What follows are the highs and lows of that two-year, spare-time, late-night, do-it-yourself adventure in linear storytelling: an adventure that would cost close to \$4,000 of my own money, occupy countless hours of my free time, but would eventually culminate in *The Mantis Parable* being screened at film festivals around the world.

SLASH DOT COM

Having a website (www.themantisparable.com) for an independent short serves several purposes. Firstly, it's a great way

to track your progress. Since the early summer of 2003, I've kept a production journal on the site (which records the obstacles I've faced), and a 'Making of Mantis' section, documenting specific texturing, modelling, and lighting techniques.

But the website's greatest feature is that it provides an interface with fans of the film, yielding a constant stream of much-needed encouragement. Discovering that you have an audience is an amazing source of motivation: in a sense, you're no longer making the film for yourself, but for everyone awaiting its completion. The realisation that other people had very high expectations for *The Mantis Parable* kept me pushing to do my very best during the late nights when I would have much preferred to just go to bed.

The film is about the relationship between a caterpillar, who's trapped in a jar, and a praying mantis who stumbles upon him. I knew clearly what I wanted the story to be about before

I had the characters in mind, and I tried to keep it as simple as possible – something I continuously reminded myself of throughout production. I realised that, as I worked on it, *The Mantis Parable* was going to grow in strange and unpredictable ways, so the simpler the foundation, the more likely I was to complete it. In fact, as my early test renderings reveal, the original plan for the setting of the film was simply the glass jar on a blue background.

After a couple of weeks trying out different ideas, I finally had my 'script' – which, given that there's no dialogue in the film, was actually more of an outline. Next came the storyboarding, which I began by 'scribbling up' a sequence of shots for Act I while on an airplane on my way home from a business trip. Storyboarding was a new experience for me, and as such, it was really an exercise in trial and error. I did my best to fully board out the first act, knowing that, when I actually began working on the film, I'd find my storyboards far from perfect. As it turned out, by the time I had completed Act I, I had more than doubled the number of shots my storyboard said would be required. An exclusive clip from the film accompanied by an overlay of that initial rough storyboard is available on this issue's CD.

THE HIGHS AND LOWS OF A TWO-YEAR, SPARE-TIME, LATE-NIGHT, D.I.Y ADVENTURE

PRODUCTION COSTS TO DATE

SOFTWARE

(Bought unregistered online)

- 3ds max 4.2 \$325
- Photoshop 7.0 \$350
- After Effects 5.5 PB \$285
- Illustrator 10 \$100
- Dreamweaver MX 2004 \$210
- Sorenson Squeeze Compression Suite, V-Ray Free

HARDWARE

- Dell 3.0GHz P4 \$800
- HP Scanner \$75
- 6x9 Wacom tablet \$150

RUNNING TOTAL: \$2,295

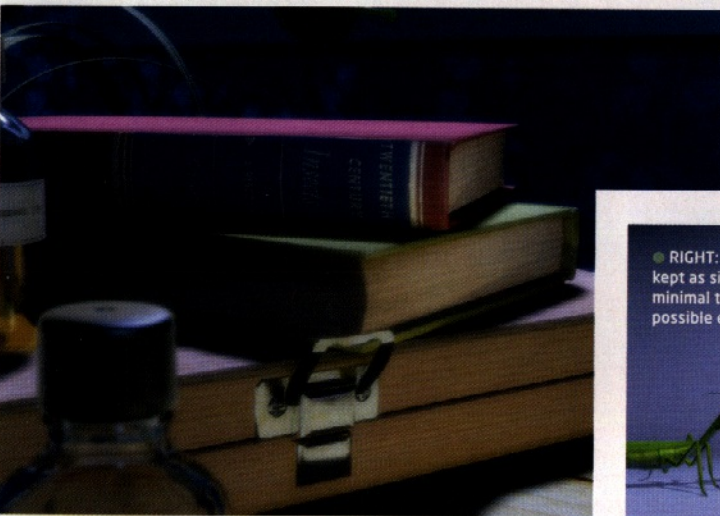


• Josh Staub's desk in the room above his garage, also known as Jubilee Studios Headquarters

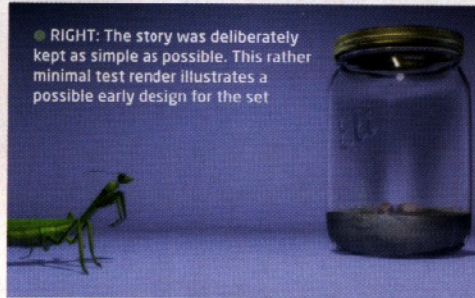


● **ABOVE:** *The Mantis Parable* features two characters: a caterpillar and the praying mantis of the title. Having realised his predicament, the caterpillar climbs the branch inside the jar, intending to escape from his glass prison

● **LEFT:** The intro sequence pans over the bug-collector's desk, setting the stage and providing a moody tone for the parable



● **RIGHT:** The story was deliberately kept as simple as possible. This rather minimal test render illustrates a possible early design for the set



At work, I currently use *3ds max*, so it seemed a logical choice for the film. At home, I had an 800MHz PIII Dell PC with 256MB RAM and 40GB HD, which I used for a couple of months before purchasing a 3.0GHz PIV Dell with 512 MB RAM and 80GB HD. This became my primary machine for the rest of the project.

BUILDING A HOME STUDIO

Seeing this as an opportunity to create a self-supporting home studio, I also began looking for my own copies of the software I'd need. In addition to *3ds max*, I used *Photoshop* for texture creation and image manipulation, *After Effects* for project assembly and compositing, and *Dreamweaver* for website development. On the net, I was able to find all my software (brand-new, shrinkwrapped, unregistered versions) for dramatically less than the RRP's, including the crown jewel of bargains: an in-the-box unregistered copy of *3ds max 4.2* for under \$500. Sorenson Media also stepped up to the plate and offered me a free copy of the wonderful *Sorenson Squeeze Compression Suite* for formatting the movie clips on my website, which I cheerfully accepted in exchange for putting the

company's logo on the site and telling people about its software. Finally, a cheap Hewlett-Packard scanner from Best Buy and a 6x9 Wacom Tablet from CompUSA completed the studio. I was ready for production... almost.

I hadn't spent enough time pre-rendering with *max*'s scanline renderer to feel comfortable. I'd been impressed with *V-Ray Advanced*, but wasn't ready to shell out \$800, so I decided to try out the free version. It lacked many of the features of the full edition but, with a little trial and error, I was able to make it work for me.

I did consider using Global Illumination, but eventually decided that I couldn't afford the rendering time. *The Mantis Parable* would be raytraced with *V-Ray Free*, but without GI. Thanks to a little patience and a lot of internet surfing, I'd spent less than \$2,500, and was ready to begin the project in earnest.

NEXT ISSUE: Production begins in earnest. Josh rigs the characters and creates the introduction to the film. As the site attracts traffic, *The Mantis Parable* also has its first brush with fame - but already the script needs rewriting...

TIMELINE

MARCH 2003

An idea for a short film dawns: a parable about a caterpillar in need of a helping hand, and a passing praying mantis

MAY 2003

A rough storyboard for Act I is scribbled while flying home from Los Angeles after attending E3. An exclusive clip from the film and an overlay of that initial rough storyboard is available on this issue's CD



● Cell from the initial storyboard for Act I

JUNE 2003

Purchasing of hardware and software required for initial production phase is complete

JULY 2003

The Mantis Parable website, complete with a 'production journal', 'making of' section, and an (empty) guestbook, goes live. For details, see the boxout below

NEXT ISSUE

Finding reference material, rigging tests, and rendering the intro sequence



SEE THE MANTIS PARABLE

● The *Mantis Parable* is currently being screened at festivals worldwide. For details, or to view the intro sequence, visit the website below. An exclusive clip from Act I (with storyboard overlay) can be found on our CD www.themantisparable.com



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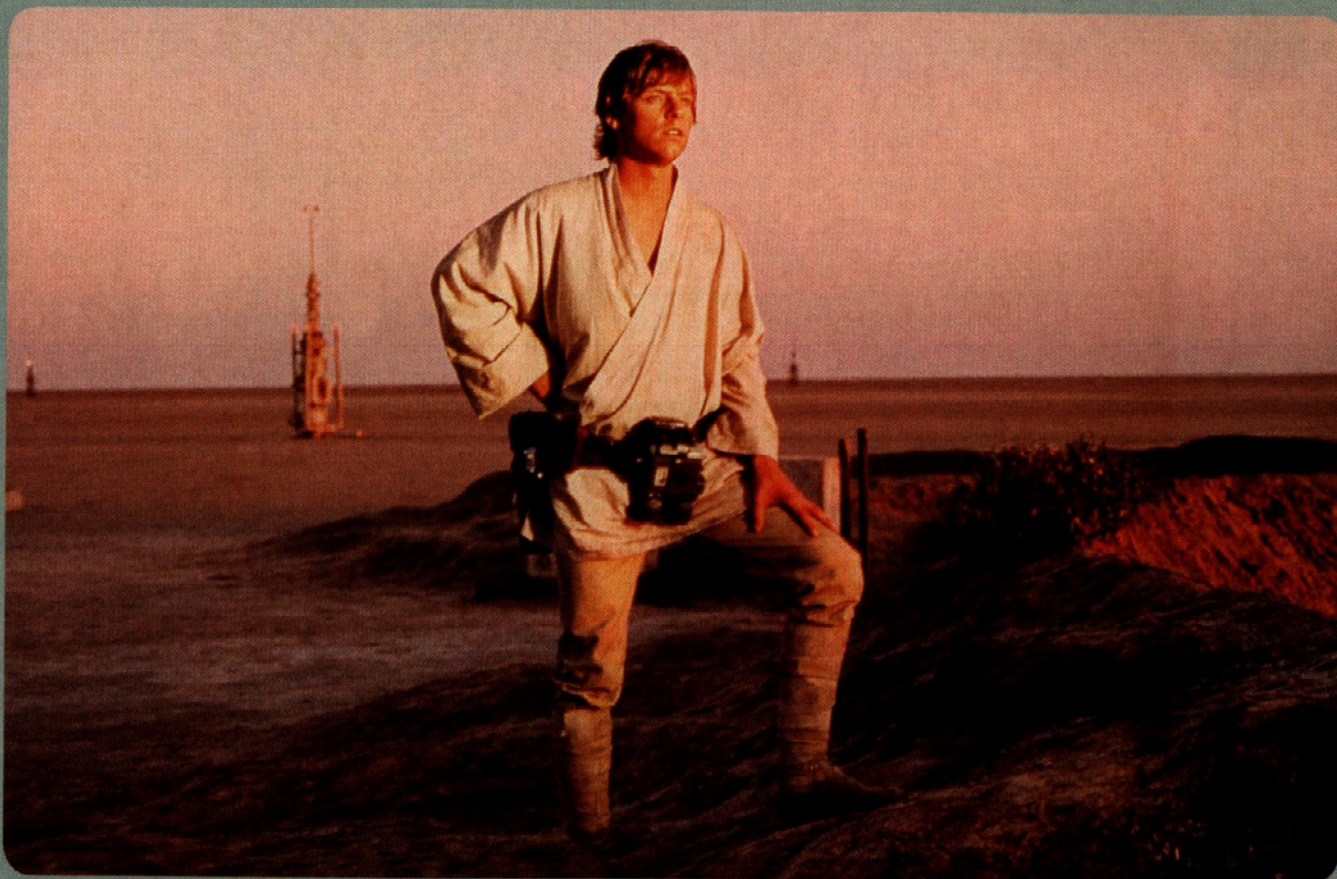


Image © The Kobal Collection

INSPIRATIONS

Framestore CFC's **Ilyas Kaduji** on the rare moment of calm in *Star Wars: Episode IV - A New Hope* that had a huge impact on his career



"FOR ALL THE chase sequences and explosions in the original *Star Wars*, it was a moment of reflection that changed the course of my life. It's near the start of the movie, where Luke is having an argument with

Uncle Owen - he wants to go with his friends and join the Academy, and Owen tells him that he can do it next year, after harvest. But he's young, full of energy; he knows that there are big things going on out there, and that he wants to be a part of them. Eventually, he walks outside to be with his thoughts, and you first see a close-up of his face... and then the twin sunsets.

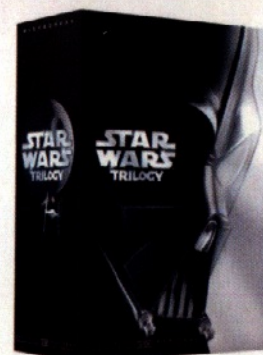
It was Luke's sense of anguish that got to me most. I was in that phase that most boys go through when they feel held back in their home lives - I must have been about nine at the time - and I imagined myself in

the movie. I've always been a bit of a dreamer, a bit of a romantic, and I thought: "Wouldn't it be great to dream like that and make it a reality?"

After that, I did anything craft or design-related I could. I went to university to study fine art, and ended up working in visual effects. That scene in the movie still influences my work - what it did was to give me the impetus to put my personal feelings into things, rather than simply make them look good. Above all, it has a child-like sense of wonder, and that's something that's all too easy to lose in the daily drudgery of life, particularly in an industry like this one."

Ilyas Kaduji is a Technical Director at Framestore CFC, where he is currently working on the new *Harry Potter* movie, which is due out 18 November 2005 [w] www.framestore-cfc.com

● **Iconic imagery:** After arguing with Uncle Owen, Luke stares out at the twin sunsets of his home planet, Tatooine, reflecting on his future



SEE FOR YOURSELF...
Star Wars: Episode IV - A New Hope is available on video and DVD as part of the *Star Wars* trilogy box set, released by Twentieth Century Fox [w] www.starwars.com

MojoWorld 2 SE

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PC/MAC Design your own science-fiction landscapes with this fully functional Special Edition of MojoWorld

MOJOWORLD 2 SE is a fully functional Special Edition of Pandromeda's fractal-based world building application *MojoWorld*, as sold for \$149. After installing the software, you'll need to obtain a registration key. The first time you run the software, simply click the 'Get Registration Key' button. This will take you to the website where you need to enter the following magazine code: **3DW066**

See page 50 for an exclusive tutorial by Calyxa Omphalos, who introduces you to the software by showing you how to create and render a science-fiction planetscape.

After you've explored *MojoWorld 2 SE*, you might want to upgrade to the latest version of the software. In *MojoWorld 3*, tools for manipulating primitives and imported models have been dramatically improved. Version 3 also adds several new object types, including pre-textured plant models, a PhotoBillboard object, a Boulder tool, and a gel spotlight.

3D World readers can buy *MojoWorld 3* at a 20 per cent discount on the retail price. For full details, turn to page 54. www.pandromeda.com

FACTFILE

FORMAT
PC / Mac

MINIMUM SYSTEM
Windows 98 SE / 2000 / XP; Mac OS9 or OS X; Pentium III / Athlon / 1GHz G4 processor; 256MB RAM

DEVELOPER
Pandromeda, Inc

WEBSITE
www.pandromeda.com

USING THE CD

GETTING STARTED

On a PC, this CD should auto-run when inserted into your CD drive. If not, run 3dw.exe. To toggle autorun on and off, use the Control Panel on your computer. On a Mac, choose 3DWClassic or 3DWIOSX to suit your operating system.

USING THE INTERFACE

The disc interface requires Windows 98, Me, 2000, XP or Mac OS 8+. You'll also need an active internet connection to make full use of the interface. For best results, ensure you're using a version 3 Web browser or better.

POINTS TO NOTE

- Some software may require free registration over the internet or by phone
- Some software may not be available in all territories
- Values quoted are the original prices for which the software was sold (including packaging and manuals).

Pupik 3D models

MAX FORMAT A selection of five transport models, worth over \$400

THIS GREAT selection of five models to use in your own projects comes courtesy of talented 3D artist pupik. For more pupik models, visit the Turbo Squid online marketplace www.turbosquid.com



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www.kurvstudios.com





FULL CD CONTENTS | What's on the 3D World disc this issue



UPCOMING EVENTS

SIGGRAPH 2005

Yes, the biggy is back - although last year's mother of all 3D shows may still feel like yesterday, it's that time again. This PDF of the advance programme gives you a sneaky peek at all the scheduled events and confirmed speakers for the five-day international conference. With George Lucas giving the keynote speech, this year's SIGGRAPH is definitely not one to miss...
www.siggraph.org/s2005

LEAD CONTENTS

MOJOWORLD 2 SE
 KURV STUDIOS ZBRUSH TRAINING
 PUPIK MODELS

For full details, see facing page



OTHER RESOURCES

100 TEXTURES

High-resolution JPEG images from morgueFile suitable for use in commercial projects. The set includes images of natural textures, paint, wood and flooring. Note: the textures are not pre-tiled
www.morguefile.com



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FREE BONUS FILES!

Additional tutorials and supporting materials are now available for download from the recently redesigned 3D World website
www.3dworldmag.com

SUPPORTING FILES

Full-sized screenshots, project files and other resources to accompany the tutorials and Q&As printed in the magazine this issue
 Magazine contents: page 4



TROUBLESHOOTING

THIS IS A FUTURE TECHNOLOGY CD-ROM. This disc has been thoroughly scanned and tested at all stages of production, but - as with all new software - we still recommend you run a virus checker before use and have an up-to-date backup of your hard drive. While every

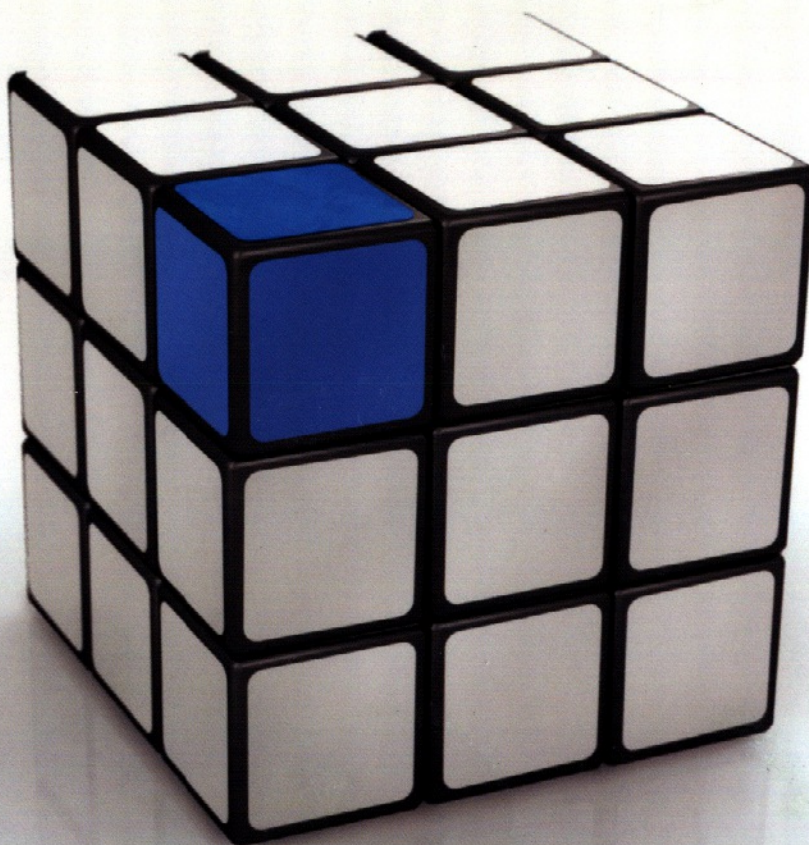
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